

# APS Topical Group on Shock Compression of Condensed Matter



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## 2021 APS SCCM Officers:

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## Message from the Chair

As 2021 comes to an end, I'd like to summarize a range of activities that took place within our dynamic and engaging GSCCM community. Although the ongoing pandemic still impacts our professional and personal lives, we as a group showed resilience and onbeat spirit while adapting to a new reality by developing innovative approaches to how we work, interact, exchange information and disseminate our results.

I would like to start my report with congratulations to Craig Tarver, the 2021 Duvall Award winner, Eric Brown newly elected APS Fellow from GSCCM and Travis Volz the 2021 SCCM Early Career Award winner.

2021 was a very busy year for our topical group. Our GSCCM Executive Committee (including officers (left) and members-at-large Marisol Koslowski, Arianna Gleason, Brittany Branch, Nenad Velisavljevic and Belinda Pacheco) met more frequently than usual to discuss and make decisions on a broad range of topics and initiatives, which are described below. I would like to thank them all for their time and active participation in our deliberations. Special thanks to our Secretary-Treasurer Matt Lane, who provided outstanding service to support day-to-day operation of GSCCM topical group as well as took care of critical communications with APS headquarters.

Although the year started with some sad news of passing two our distinguished members – Duvall award winners Gennady Kanel and Vladimir Fortov, both died from complications of COVID-19, the science advance in unimaginably rapid development of the vaccines and their wide availability in the first half of the year brought some optimism of getting back to normality. Even some of us, including your chair, have recently started attending conferences in person, which

was a big enjoyment after Zoom/WebEx/Teams “fatigue”. From my own very recent experience, the effective public health measures combined full vaccination provide a very safe environment for in-person conference attendees, thus giving us a high degree of confidence that 22nd Biannual SCCM conference will happen in person.

The conference was supposed to take place last summer but was postponed due to uncertain COVID-19 situation. In this regard, I would like to thank Jen Jordan and Ari Gleason, the SCCM-2022 chairs for their tireless work to negotiate a hotel cancellation in Chicago without incurring any cancellation fees and making arrangements with APS help for a new date and location: July 11-15, Anaheim, CA. The SCCM-2022 chairs together with technical committee is currently working on technical program and we will hear from them very soon with the call for abstracts. See page 4.

Conferences, workshops and seminars are vital parts of our professional life. To mitigate the effect of pandemic on scientific exchanges, our group has started a GSCCM Virtual Shock Compression Seminar Series on dynamic compression of materials. I'd like to thank Tracy Vogler and the GSCCM seminar committee for initiating this important effort and devising an excellent program of extremely interesting talks from both leading scientists in our field as well as early career researchers. See Page 3 for more details on the seminar series organizers and upcoming talks.

In August, GSCCM organized a Virtual Student and Early Career Symposium. This event was proposed to the GSCCM leadership by Eric Brown and Ryan Wixom as a remedy for young researchers who were impacted by the COVID-19 delay of our

(Message from the Chair continued from page 1)

biennial conference. I'd like to thank Eric and Ryan for advancing this important initiative and making this event a great success. Read more about the symposium in Past Meetings (Page 5)

We have exciting news regarding March Meeting this year. See the Upcoming Meetings (Page 4) for more details. Our program committee is currently working on sorting abstracts and drafting the programs for both our focus topic and new invited symposium sessions, which will span the conference week!

Our GSCCM leadership is also working on two new initiatives with potential significant impact on our Topical Group. One of them is to establish the APS "Neil Ashcroft Early Career Award for Studies of Matter at Extreme High Pressure Conditions". Neil Ashcroft was a visionary scientist in the field of high pressure physics, who provided a critical support for establishment of GSCCM in the 1980s. This award will recognize early-career scientists within 10 years after their PhD for their outstanding research in matter at extreme conditions. The endowment for the award has been provided by Ashcroft family. The GSCCM Executive Committee is currently working with APS awards department to formalize the award.

The GSCCM Executive Committee is also examining opportunities to expand the scope of GSCCM topical group to include researchers from broadly defined area of

"Matter at Extreme Conditions". We have started a discussion of this initiative at the GSCCM Business meeting in March 2021. Subsequently, an ad-hoc committee has been formed to examine feasibility of such expansion. The committee is developing a plan for broader engagement with GSCCM community aimed at receiving a critical feedback.

The last, but not the least, a call for proposals to organize the 2023 Biennial SCCM conference has been sent out. The meeting location (Chicago, IL) and the dates (June 19-23, 2023) has been set, and the APS Meetings department is taking care of hotel logistics/contracting as well as other technical aspects of conference organization. Therefore, the conference organizers are expected to focus on developing vibrant scientific program of the meeting. The proposals should be submitted to the GSCCM chair or Secretary-Treasurer as soon as possible, but no later than December 1, 2021.

I am sure the new 2022 year will be even more successful and full of new exciting developments within our vibrant GSCCM topical group.

Best wishes and Happy Holidays,

**Ivan Oleynik**

### Call for SCCM-2023 Conference Organizers

Interest and proposals are now being solicited to organize the *23rd Biennial Conference on Shock Compression of Condensed Matter* for the summer of 2023.

Typically a team of two or three people is needed to organize the conference. The meeting location (Chicago, IL) and dates (June 19-23, 2023) have been set, and the APS GSCCM have pre-negotiated the hotel logistics/contracting. Therefore, conference organizers can focus on the technical committee planning, outreach and execution. Conference organizers do not need to be from the Chicago area, but a local presence might be helpful.

Those interested should send a short statement of interest and/or questions to the GSCCM Chair, Ivan Oleynik (oleynik@usf.edu), and/or Secretary, Matt Lane (jlane@sandia.gov) as soon as possible, but **no later than December 1, 2021**.

## Shock Seminar Series Speakers

**Tuesday, December 7, 2021 at 12:00 PM Eastern Time**

Zoom info at: <http://www.aps.org/units/gsccm/>

**Talk 1:** *Observing and Modeling Hot Spots in Individual Explosive Crystals with Shock Compression Microscopy*

**Dr. Belinda Pacheco Johnson**  
Univ. of Illinois at Urbana-Champaign  
Los Alamos National Laboratory

Experimentally interrogating the chemistry and physics of plastic-bonded explosives (PBXs) requires detection techniques which span multiple time and length scales (fs- $\mu$ s, nm- $\mu$ m). We aim to better understand the underlying, microstructure-induced sensitivity of PBXs by, 1) conducting tabletop experiments on individual explosive crystals to elucidate hot spot dynamics and temperature, and 2) comparing results to microstructurally informed, reactive simulations. We have developed a tabletop apparatus which employs laser-driven impactors to impart initiating shocks to the explosive sample. Multiple optical and spectroscopic probes are coupled to the apparatus which image explosive emission with  $\mu$ m spatial resolution and resolve hot spot temperatures down to several ns. The explosive samples consisted of 1,3,5,7-tetranitro-1,3,5,7-tetrazoctane single crystals embedded in multiple transparent polymers and shocked at several input pressures. Simulations were conducted using conducted using interface-resolved reactive simulations using a sharp-interface Eulerian framework. This new methodology provides the means to evaluate the influence of microstructural energy localization and predict mesoscale behavior of PBXs.

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*The GSCCM virtual seminar series covers topics of interest in materials response to high pressures, strain rates, and temperatures. Applications of interest include high velocity impact, explosives, and inertial confinement fusion. The series will cover recent experimental, theoretical, and computational advances in the field as well as more holistic views of key topics.*

*GSCCM Virtual Seminar Series Organizing Committee  
Minta Akin, Dana Dlott, Dan Eakins, Christopher "Kit" Neel, Laura Smilowitz, and Tracy Vogler*

**Talk 2:** *Direct Proof of Inelastic Shear Release in Silicon under Laser-Driven Shock Compression*

**Dr. Silvia Pandolfi**  
SLAC National Accelerator Laboratory

The deformation of materials under dynamic compression is critical for a variety of phenomena, ranging from planetary science to shielding engineering. However, a precise understanding of the atomistic mechanisms driving structural changes at these ultra-fast timescales remains largely elusive. Here, we focus on the characterization of silicon, which deformation mechanism is still an open question despite decades of research. Simulations suggested that, in silicon, the shear stress generated during shock compression is released inelastically, i.e., via a high-pressure phase transition, challenging the classical picture of relaxation via defect-mediated plasticity. However, direct evidence supporting either deformation mechanism is still lacking. Using sub-picosecond highly-monochromatic x-ray diffraction to measure (100)-oriented silicon under laser-driven shock compression, we are able to provide the first direct evidence of silicon peculiar inelastic deformation. Our results resolve a longstanding controversy, demonstrating silicon's strain rate-dependent response. Particular care should be thus taken when using dynamic compression data to interpret static phenomena, such as phase equilibria at planetary interiors conditions.

### Volunteers Needed Newsletter Staff

As the GSCCM Topical Group reinvents our Member Newsletter, we seek Newsletter staff volunteers.

This is a great way to get involved and network with the community.

Writers, Editors, Designers needed.

Contact Matt Lane, [jlane@sandia.gov](mailto:jlane@sandia.gov)

## Upcoming Meetings

### 22nd Biennial SCCM Conference



#### Shock Compression of Condensed Matter ANAHEIM, CA | JULY 2022

The 22nd Biennial APS Shock Compression of Condensed Matter Conference will be held in Anaheim, CA on July 11-15, 2022 at the Anaheim Marriott.

We look forward to a dynamic, **in-person** conference. Please watch for announcements at the SCCM conference website. Abstract submission will open in early January.

The conference hotel is just one mile from the Disneyland Resort attractions. The conference will be a great time to reconnect with your SCCM colleagues. Bring your family and celebrate getting together after a tough few years!

The hotel reservation is currently open. ***Please book your hotel through the link on the conference website.***

Anaheim is located in Orange County, California close to Los Angeles. It's home to Disneyland and the Anaheim Ducks ice hockey club and the Los Angeles Angels baseball team. The hotel is close to multiple golf courses and about 20 miles from the beach.

#### Upcoming Dates:

January 2, 2022 – Call for abstracts  
January 5, 2022 – Abstract Submission Open  
March 4, 2022 – Abstract Submission Closes  
March 21, 2022 – Online Registration Opens

#### Conference Website:

<https://engage.aps.org/gscdm/meetings/biennial-2022>

**Early Career Symposium Chair:** Svetlana Stekovic

**Conference Proceedings Editors:** J. Matthew Lane, Mike Armstrong, and Tim Germann

#### SCCM 2022 Conference Co-Chairs:

Arianna Gleason, [ariannag@stanford.edu](mailto:ariannag@stanford.edu)  
Jennifer Jordan, [jljordan@lanl.gov](mailto:jljordan@lanl.gov)

### 2022 APS March Meeting

Our GSCCM topical group will have a strong presence at the 2022 APS March Meeting. The conference will take place in person with virtual participation in Chicago on March 14-18, 2022. The GSCCM program committee (John Borg, Peter Celliers, Ivan Oleynik, Nenad Velisavljevic, and Eva Zurek) put main emphasis on early career researchers in selection of invited speakers. The committee carefully evaluated a pool of more than 50 nominations before final selection of the invited speakers for our “Matter at Extreme Conditions” focus topic sessions. In addition, more than 140 contributed abstracts were submitted - a welcome surprise in a year of our bi-annual SCCM-2022 meeting.

This year, GSCCM is also organizing an Invited Symposium “Frontiers of High-Energy Density Physics” at the March Meeting. Spurred by the announcement of breakthroughs in fusion ignition at Lawrence Livermore National Laboratory’s (LLNL’s) National Ignition Facility (NIF), in August 2021, we approached the APS March Meeting organizing committee with an urgent request to organize the invited symposium. Upon approval of our proposal and based on recommendations of several HED leaders five early career presenters from the national labs and academia were selected. They will highlight recent developments in HED physics, enabled by the advent of large-scale experimental and computational facilities including powerful lasers, pulsed-power, bright x-ray sources and high-performance computing. We expect this exciting development will increase GSCCM visibility within the APS.

### Upcoming Meeting Information

#### 18th European Mechanics of Materials Conference

April 4th-6th, 2022, Oxford

<https://www.emmc18.org/>

#### Mach 2022 Conference

April 6-8, 2022, Baltimore, MD

<https://machconference.org>

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## Honors and Awards

### 2021 George E. Duvall Shock Compression Science Award Recipient

**Craig M. Tarver**  
Lawrence Livermore National Laboratory

**Citation:**

*"For theoretical advancement of the understanding of shock-driven reactions and detonation in condensed phase explosives."*

**Background:**

Craig Tarver received a B.S. degree in Chemistry from Clarkson University in 1968. He received a Ph.D. in Chemistry from The Johns Hopkins University in 1973. He was a captain in the U. S. Army reserves. Craig was employed by SRI International from 1973 to 1976 as a chemist. He then was employed by Lawrence Livermore National Laboratory from 1976 to 2020 as a theoretical chemist. His main research interests involve modeling chemical reac-

tion rates in energetic materials. His main research areas are: detonation (non-equilibrium ZND theory); shock initiation (Ignition and Growth and Statistical Hot Spot models); thermal decomposition and explosion (multiple reaction chemical kinetic models); deflagration to detonation transition; impact ignition; and equations of state. Craig has been a member of the Topical Group for the Shock Compression of Condensed Matter since its establishment and served as its chairman in 2001. He was named an APS Fellow in 2004.



### 2021 APS Fellow for GSCCM

**Eric Brown**  
Los Alamos National Laboratory

*Citation: "For technical leadership in the physics of materials at high pressures and strain rates, for technical advances in the understanding of the mechanical behavior of polymers, and for sustained leadership and service to the American Physical Society and the shock physics community."*



Nominated by: Topical Group on Shock Compression of Condensed Matter

NOTE: The SCCM topical group was allocated only one Fellowship in 2021, down from two in prior years, due to a drop in 2021 GSCCM membership proportion of APS.

### 2021 Early Career Award Recipient

**Travis Volz**  
Washington State University

*To recognize outstanding work in shock compression science by either a current graduate student or a researcher within two years of PhD completion*

Travis earned his PhD in Physics in 2020 from Washington State University. His dissertation research at the Institute for Shock Physics (ISP) investigated the shock-induced graphite to diamond transformation, including the role of graphite crystal structure and microstructure. He has accepted a position at Lawrence Livermore National Laboratory. Travis will accept his award and present an invited talk at the 2022 SCCM Conference.



## Past Meetings

### 2021 Student and Early Career Virtual Shock Compression Symposium

The GSCCM Student and Early Career Symposium was held August 3-4, 2021 in a virtual/online format. This event was designed to offer young researchers an opportunity to network and present their work in the gap year created by the Biennial SCCM Conference's deferral to 2022 due to COVID-19. Proposed and Co-Chaired by Eric Brown (Los Alamos) and Ryan Wixom (Sandia), this virtual meeting hosted 22 contributed talks, and an invited plenary talk presented by the 2021 Early Career Award Recipient, Travis Volz.

The event was hosted on ZoomGov, which provided a secure open platform for talks and discussion. LANL provided the use of Zoom for the two days at no cost. At any given time, we had 30 to 40 participants. In addition to active virtual discussions, there was extensive dialogue going on through the symposium via Zoom Chat.

The Chairs would like to thank for following volunteers for their help in executing this successful, no-cost event. Thanks to Cindy Bolme (LANL) for introducing chairing the Early Career Award session; Mitch Wood (SNL) for chairing sessions; and Matt Lane (SNL) for supporting topical group mailing and admin. Belinda Pacheco Johnson (UIUC) moderated a panel discussion with members, June Wicks (Johns Hopkins University), Cyril Williams (ARL), David Damm (SNL), and Federica Coppari (LLNL).

### 2021 APS March Meeting

The GSCCM is continuing its highly visible participation in APS March Meetings. Our community used the opportunity this year to get together in virtual format to present new discoveries as well as discuss exciting technical developments by submitting 180 abstracts to our "Matter at Extreme Conditions" Focus Topic sessions. We thank all our invited and contributed presenters, as well as session chairs for making our Annual Meeting a great success. Our FT was one the largest focus topics across all the APS units, and spanned the entire week of the 2021 APS March Meeting! The GSCCM business meeting was held virtually during the conference and was well attended. In addition to the standard reports a new initiative to expand the scope of our topical group was discussed.

#### Scientist 2/3

##### Los Alamos National Laboratory, Los Alamos, NM

The Physics and Chemistry of Materials group (T-1) at Los Alamos National Laboratory (LANL) is seeking qualified applicants for possible staff position openings in several research areas. The candidate will be expected to perform outstanding research in the field of computational physics and chemistry on problems related to the properties and dynamics of materials. This includes development and application of new and improved models for the physics, chemistry and engineering used in a broad set of materials-related areas.

For more information see <https://lanl.jobs/los-alamos-nm/scientist-23/6D99A2579E5B46F8847088473B-7CB6C1/job/>.

#### Shock Physics Researcher (Experienced)

##### Sandia National Laboratories, Albuquerque, NM

Sandia National Labs is looking for someone to become a key member of the team at the Shock Thermodynamics Applied Research (STAR) Facility. You will work as part of a multi-disciplinary team in planning, preparing for, and executing experiments. You will have an active role in the day-to-day operation of the facility. On any given day you may be called on to: provide direction and leadership to STAR personnel including coordination of daily activities; manage workflow through the STAR Facility including long term planning of test activities; work with team members to design test hardware, collaborate with design engineers to prepare manufacturing drawings, submit work orders for manufacturing, and ensure parts are received timely; develop and maintain operating procedures, safety documentation, and other regulatory paperwork covering operations at STAR; assist in the development of long-term sustainability plans to ensure the STAR Facility will continue to operate for the next 50 years; work with existing customers to meet schedules and recruit new work for the facility; and conduct independent research through collaboration with associates on dynamic material properties of interest to NNSA and other partners.

Required qualifications include: a Ph.D. in Mechanical Engineering, Material Science, Physics, or related field or an equivalent combination of education and relevant experience (Master's plus 4 years, Bachelor's plus 8 years); experience overseeing an experimental laboratory; experience conducting experimental research on material properties; strong technical writing skills including the ability to prepare effective documentation as demonstrated by publications in scientific journals or internal memos/reports/operating procedures; and the ability to obtain and maintain a DOE Q clearance. Additional desired qualifications can be found on the job posting website. For additional information or to apply, visit <https://www.sandia.gov/careers> and JobID 679263.

**Applications accepted through December 6, 2021.**

(Upcoming Meetings continued from page 4)

**32nd International Symposium on Ballistics,**

May 8-13, 2022, Reno, Nevada, USA

<https://ballistics.org/>

Contact: Dr. Thelma Manning and Mr. Rick Rickert

**3rd International Conference on Impact Loading of Structures and Materials - ICILSM 2022**

June 13-17, 2022, Trondheim, Norway

<https://www.ntnu.edu/icilsm2022>

Contact: Magnus Langseth and Peter Karlsaune

**22nd Biennial APS Shock Compression of Condensed Matter (SCCM-2022) Conference**

July 11-15, 2022, Anaheim, CA

<https://engage.aps.org/gscmm/meetings/biennial-2022>

**Research at High Pressure - Gordon Conference**

July 17-22, 2022, Holderness School, Holderness, NH

[www.grc.org/research-at-high-pressure-grs-conference/](http://www.grc.org/research-at-high-pressure-grs-conference/)

Chairs: Sakura Pascarelli and Chris Pickard

**Hypervelocity Impact Symposium (HVIS)**

September 18-22, 2022, Alexandria, VA, USA

<http://hvis2022.jhuapl.edu>

**23rd Biennial APS Shock Compression of Condensed Matter (SCCM-2023) Conference**

June 19-23, 2023, Chicago, IL

## Obituaries

### Gennady I. Kanel

1944-2021

Professor Gennady Isaakovich Kanel, Corresponding Member of the Russian Academy of Sciences and Professor of Moscow State University, passed away after a month-long battle with COVID-19. Gennady Isaakovich Kanel was born in Kemerovo City (in Siberia, Russia) on 30 June 1944. After graduation from Tomsk State University in 1967, he started his scientific career at the Institute of Problems of Chemical Physics of the Russian Academy of Sciences (Chernogolovka, Moscow Region). In 1972, he completed his dissertation entitled, "Studies of Wave Interactions and Spallation in Condensed Matter," and in 1987 his Doctor of Science degree, "Relaxation processes in shock compressed condensed matter." Prof. Kanel served as Head of Department and Deputy Director of the Institute for High Energy Densities (IHED). In 2006, he was elected as a Corresponding Member of Russian Academy of Sciences.



Gennady's prolific scientific career has been focused solely on solving outstanding problems of shock compression physics. His pioneering studies of temperature effects on high-rate deformation and fracture of metals and alloys revealed an anomalous growth of dynamic strength upon heating. He discovered and investigated superheated solid states

of single crystal metals, failure waves and propagation of failure fronts in shock-compressed glasses. He developed a new technique for studying compressive failure of brittle materials, using sample pre-stressing and divergent shock loading. He made seminal contributions to the understanding of shock-induced polymorphic transformations by performing systematic studies of the graphite to

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diamond phase transition and iron transformation reversal. Gennady studied sub-microsecond elastic-plastic and strength properties of a vast collection of materials over wide ranges of peak stress, load duration and temperature. He also made important contributions to the study of spall fracture of solids; strength and dynamic compression; spallation phenomena upon ultrafast sub-nanosecond loading; failure waves in brittle ceramics; and thermal hardening of pure metals. Gennady authored more than 250 scientific papers and published six monographs. In 2013, Prof. Kanel received the George E. Duvall Shock Compression Science Award of the American Physical Society for outstanding contribution to the physics of shock waves in condensed matter, discovery and studying anomalous thermal hardening, superheated solid states, failure wave phenomena, investigations of sub-microsecond strength properties of materials over a wide range of load durations and temperatures. His achievements have been highly recognized by the shock physics community.

Gennady Kanel is deeply missed by his close relatives, friends, colleagues, and students.

## Vladimir E. Fortov

1946-2020

Vladimir Fortov passed away on 29 November 2020 in Moscow at the age of 74 due to COVID-19 infection. Academician Vladimir Fortov was a world-renowned Soviet and Russian physicist who made outstanding and pioneering contributions to high energy density physics, plasma physics, shock waves, detonation, and, more generally, the physics and chemistry of extreme states of matter. He authored over 900 papers and 30 books.



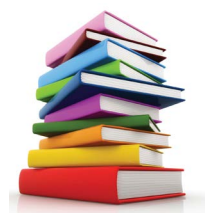
Vladimir E. Fortov was born in Moscow, Russia on 23 January 1946. In 1962 he entered Moscow Institute of Physics and Technology (MIPT). After completing his M.Sc. in Strongly Coupled Plasma Physics in 1971, he was invited by Nobel Laureate acad. N. Semenov to the Institute of Chemical Physics of the Russian Academy of Sciences (RAS). There, he joined the teams of Prof. Lev Altshuler and acad. Yakov Zeldovich, working in the field of intense shock and detonation waves and dynamic high pressure. In 1976, he was awarded a Doctor of Science degree from the Russian Academy of Sciences for his work "Physics of Strongly Coupled Plasma Generated by Intense Shock Waves." In 2013, Prof. Fortov was elected President of the Russian Academy of Sciences. He was also vice-chair of the Presidential Council for Science and Education and member of the Scientific Advisory Board of the UN Secretary-General.

Prof. V. Fortov performed pioneering experimental investigations on the physical properties of hot dense matter at megabar pressures for applications in astro- and planetary physics, energetics, engineering, and for other high temperature applications. He was one of the first to apply intense shock waves for investigations of physical properties of plasmas under extreme pressure and temperature. Prof. V. Fortov carried out new detailed measurements of physical properties (equation of state, conductivity, opacity, stopping power, light reflectivity, plasma composition, et-cetera) of strongly coupled plasmas with strong interparticle interactions. He made key contributions to understanding the fundamental properties of matter under extreme conditions.

Among his many prizes and medals, Vladimir E. Fortov was awarded the L.P. Karpinsky Prize in Physics and Chemistry in 1997; the Bridgman Award for achievements in High Pressure Physics and Technology in 1999; the Max-Planck Award for Physics in 2002; and the Alfven Prize of European Physical Society in 2003. In 2005, he received George E. Duvall Shock Compression Science Award for pioneering research in high-energy density physics, strongly-coupled plasmas, hot-condensed matter, shock-compression science and their applications.

He was a Member of Russian Academy of Sciences, European Academy of Sciences, International Academy of Astronautics, Max Planck Society, Fellow of American Physical Society, and Foreign Member of the US National Academy of Science, the US National Academy of Engineering, the UK Royal Engineering, and the Swedish Royal Academy of Engineering Sciences.

Vladimir Fortov will be greatly missed.



## Bookshelf

### Books and Proceedings

The Bookshelf is curated by member Stephen Walley. His database of recent and historical shock papers can be found on the [GSCCM website](https://www.gscm.org). Member authored/edited works are highlighted.

*Advances in Experimental Impact Mechanics*

Editor: Bo Song

[ISBN: 9780128233252](#), Elsevier, 2022.

*ASM Handbook, Volume 24: Additive Manufacturing Processes*

Editors: David L. Bourell, William Frazier, Howard Kuhn, and Mohsen Seifi

[ISBN: 9781627082884](#), ASM International, 2020.

*Atomic Doctors: Conscience and Complicity at the Dawn of the Nuclear Age*

Author: James L. Nolan, Jr.

[ISBN: 9780674248632](#), Belknap Press, 2020.

*Boron Carbide: Structure, Processing, Properties and Applications*

Editor: Kolan Madhav Reddy

[ISBN: 9781536171211](#), Nova Science Publishers, 2020.

*Challenges in Mechanics of Time Dependent Materials: Conference Proceedings of the Society for Experimental Mechanics Series*

Editors: Meredith Silberstein and Alireza Amirkhizi

[ISBN: 9783030595418](#), Springer Nature, 2020.

*Chemical Kinetics in Combustion and Reactive Flows: Modeling Tools and Applications*

Authors: V. I. Naoumov, V. G. Krioukov, A. L. Abdullin, and A. V. Demin

[ISBN: 9781108427043](#), Cambridge Univ. Press, 2019.

*Composite Materials for Extreme Loading: Proceedings of the Indo-Korean Workshop on Multi Functional Materials for Extreme Loading 2021*

Editors: Shankar Krishnapillai, Velmurugan R., and Sung Kyu Ha

[ISBN: 9789811641374](#), Springer Nature, 2022.

*Computational Approaches for Chemistry Under Extreme Conditions*

Author: Nir Goldman

[ISBN: 9783030056001](#), Springer Nature, 2019.

*Contemporary Kinetic Theory of Matter*

Authors: J. R. Dorfman, Henk Van Beijeren, and T. R. Kirkpatrick

[ISBN 9780521895477](#), Cambridge Univ. Press, 2021.

*Dynamic Behavior of Materials: Proceedings of the 2019 Annual Conference on Experimental and Applied Mechanics*

Editors: Lamberson, Leslie Elise

[ISBN 9783030300210](#), Springer Nature, 2019.

*Dynamic Behavior of Materials: Proceedings of the 2020 Annual Conference on Experimental and Applied Mechanics*

Editors: Leslie Lamberson, Steven Mates, and Veronica Eliasson

[ISBN: 9783030599478](#), Springer Nature, 2020.

*Dynamics, Strength of Materials and Durability in Multi-scale Mechanics*

Editors: Francesco dell'Isola, and Leonid Igumnov

[ISBN: 9783030537555](#), Springer Nature, 2020.

*Electro-discharge Technology for Drilling Wells and Concrete Destruction*

Authors: V. Ya. Ushakov, V. F. Vajov, and N. T. Zinoviev

[ISBN: 9783030045913](#), Springer Nature, 2019.

*Emerging Energetic Materials: Synthesis, Physicochemical, and Detonation Properties*

Authors: Dabir S. Viswanath, Tushar K. Ghosh, and Veera M. Boddu

[ISBN: 9789402411997](#), Springer Nature, 2018

*Explosion Shock Waves and High Strain Rate Phenomena*

Editors: K. Hokamoto, and K. Raghukandan

[ISBN 9781644900321](#), Materials Research Forum, 2019.

*Explosion Systems with Inert High-Modulus Components: Increasing the Efficiency of Blast Technologies and Their Applications*

Authors: Igor A. Balagansky, Anatoliy A. Bataev, and Ivan A. Bataev

[ISBN: 9781119525448](#), Wiley, 2019.

*Explosive Welding: Processes and Structures*

Authors: B.A. Greenberg, M. A. Ivanov, S. V. Kuzmin, and V. I. Lysak

[ISBN: 9780367355784](#), CRC Press, 2020.

*Flashes of Creation: George Gamow, Fred Hoyle, and the Great Big Bang Debate*

Author: Paul Halpern

[ISBN: 9781541673595](#), Basic Books, 2021.

*Geologic Fracture Mechanics*

Author: Richard A. Schultz

[ISBN: 9781107189997](#), Cambridge Univ. Press, 2019.

*Global Approaches to Environmental Management on Military Training Ranges*

Editors: Tracey J. Temple and Melissa K. Ladyman

[ISBN: 9780750316033](#), IOP Publishing, 2020.

*High-Power Laser-Plasma Interaction*

Authors: C. S. Liu, V. K. Tripathi, and Delhi Bengt Eliasson

[ISBN: 9781108480635](#), Cambridge Univ. Press, 2019.

*Impact Mechanics*

Author: W. J. Stronge

[ISBN: 9780521841887](#), Cambridge Univ. Press, 2019.

*Innovative Energetic Materials: Properties, Combustion Performance and Application*

Editors: WeiQiang Pang, Luigi T. DeLuca, Alexander A. Gromov, and Adam S. Cumming

[ISBN: 9789811548307](#), Springer Nature, 2020.

*Introduction to Simple Shock Waves in Air: With Numerical Solutions Using Artificial Viscosity*

Author: Seán Prunty

[ISBN: 9783030025656](#), Springer Nature, 2019.

*Mechanics and Physics of Solids at Micro- and Nano-Scales*

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The APS Topical Group on Shock Compression of Condensed Matter (GSCCM) was founded in 1984 to promote the development and exchange of information on the dynamic high-pressure properties of materials. The Topical Group sponsors biennial technical meetings on shock compression and detonation physics research, including experimental, theoretical and computational studies, and new experimental methods and developments.