Foreword

Special Issue Featuring Selected Papers from the 28th International Conference on Transport Theory (ICTT28)

Guest Editors

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In September 2024, the 28th International Conference on Transport Theory (ICTT28) was held in the Eternal City —Rome, Italy. The event took place in the shadow of the Colosseum at the University of Notre Dame's Rome campus, with significant contributions from Sapienza University of Rome. The biennial ICTT conference brings together researchers from a diversity of fields, all united by the common thread of solving transport and kinetics problems underpinned by the Boltzmann transport equation. The 2024 meeting also coincided with the retirement of Prof. Barry Ganapol. His contributions to ICTT over the years—technical, administrative, and social—will be greatly missed. Fortunately, the meeting gave the community an opportunity to offer a hearty *brindisi* to our colleague.

In this special issue of *Nuclear Science and Engineering*, we collect papers from ICTT28 that are of particular interest to the nuclear engineering community. The first three papers present novel benchmark solutions to transport problems. The paper by Garcia contains solutions to transport problems in spherical geometry with voids, a problem that continues to vex scholars. The second paper, by Ganapol and Mostacci, introduces a new method of solution for the Double PN form of the transport equation. The triumvirate of benchmarks is rounded out by the work of Bennett et al., in which analytic transport solutions are derived for particles streaming through a blast wave, with an eye toward verifying imaging calculations.

The paper by Ortega et al. applies a low-rank decomposition of the transport solution. The authors demonstrate how a tensor-train representation of the angular flux can lead to methods that are efficient in both memory and floating-point operations.

The final three papers explore deviations from the standard neutron transport formulation. Barichello et al.'s paper examines the computation of multiplicity moments of the neutron field, with applications in nuclear safeguards. This is followed by Humbert's paper on the use of deterministic transport to compute counting statistics in scenarios where particle populations are small enough that fluctuations from the mean must be considered to correctly interpret measurements. Finally, Rahnema and Zhang present a paper in which stochasticity appears in a different context: They show that, by using stochastic perturbations, the response functions required for the COMET method can be updated to reflect changes in materials without the need for a new Monte Carlo calculation.

We hope the reader enjoys these papers and is inspired to attend a future ICTT. To that end, the 29th ICTT will be held in 2026 in Aix-en-Provence at the École Supérieure Nationale d'Arts et Métiers, hosted by Prof. Jean Ragusa of Texas A&M University.

The organizers of ICTT28 would like to thank Prof. Renato Gatto of Sapienza, as well as Isabella Ferri, Simone De Cristofaris, and Anna Ricigliano of Notre Dame Rome, along with all attendees, for a memorable meeting.

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