

## XVII Polish Workshop on Relativistic Heavy-Ion Collisions: Phase diagram and Equation of State of strongly interacting matter



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### Integrable equation of state and finite size effect

*Sunday 15 December 2024 13:00 (15 minutes)*

We analyze an effective statistical model for nuclear matter based on a virial-type expansion for the internal energy. In the thermodynamic limit, the order parameter satisfies an integrable partial differential equation, whose solution is a family of equations of state unveiling nuclear and quark-hadron phase transitions through gradient catastrophe and shock formation. We further demonstrate that corrections to the critical behavior, accounting for a finite number of particles in the system, are not just non-negligible but also important in heavy-ion-collision experiments.

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