ID de Contribution: **11** Type: **Non spécifié**

# The Morawetz problem for supersonic flow with cavitation

*jeudi 6 novembre 2025 16:30 (45 minutes)*

We are concerned with the existence and compactness of entropy solutions of the compressible Euler system for two dimensional steady potential flow around an obstacle for a polytropic gas with supersonic far-field velocity. This problem was first formulated by Morawetz in 1985 and has remained open since then. In this paper, we develop a complete compactness framework that allows for cavitation and show how it can be applied to obtain an existence theorem for the Morawetz problem by developing a new entropy analysis, in combination with a vanishing viscosity method and compensated compactness ideas. The main difficulty is that the problem becomes singular as the flow approaches cavitation, resulting in a loss of strict hyperbolicity and a singularity of the entropy equation for the case of adiabatic exponent □=3. Our analysis provides a complete description of the entropy and entropy-flux pairs via the Loewner-Morawetz relations, which leads to the establishment of the compensated compactness framework. As direct applications of our entropy analysis and the compensated compactness framework, we further obtain the compactness of entropy solutions and the weak continuity of the compressible Euler system in the supersonic regime.

**Orateur:** SCHULZ, Simon (Université de Versailles Saint-Quentin)