Robert Alicki

Quantum origin of shock waves

In this joint work with Alejandro Jenkins we argue that the quantum phenomenon of superradiance for quantum fields interacting with moving quantum heat baths and caused by stimulating emission could explain the enigmatic phenomenon of shock waves generation in the macroscopic world. The model can be applied to supersonic boom, water waves generation by wind, mechanical instabilities, dry friction, Cherenkov radiation, heating of stellar atmospheres by MHD waves, superradiance by rotating black holes and perhaps even singularities in general relativity.