

Departmental Colloquium

Stable shock formation for the compressible Euler equations

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Abstract: The mathematical analysis of shock formation for the Euler equations has a long and rich history, particularly in the case of one space dimension, which allows the full power of the method of characteristics to be employed. The first proof of shock formation for the compressible Euler equations in the multi-dimensional setting was given by Christodoulou-Miao ('14) with the restriction to irrotational flow. In a recent joint work with T. Buckmaster (Princeton) and S. Shkoller (UC Davis) we have provided an elementary constructive proof of shock formation from smooth initial datum of finite energy, with no vacuum regions, and with order unity vorticity. The blowup time and location can be explicitly computed and the solution at the blowup time is precisely of cusp-type, with precisely Holder $C^{1/3}$ regularity.

Friday, November 8 at 3:00 PM in 636 SEO