

# Abstract

In this talk, I will present a recent result joint with Huihui Zeng at Tsinghua University on the free surface problem of a highly subsonic heat-conducting inviscid flow. Adopting a geometric approach developed by Christodoulou and Lindblad in the study of the free surface problem of incompressible inviscid flows, we give the *a priori* estimates of Sobolev norms in 2-D and 3-D under the Taylor sign condition by identifying a suitable higher order energy functional. The estimates for some geometric quantities such as the second fundamental form and the injectivity radius of the normal exponential map of the free surface are also given.

I will discuss the issues of the strong coupling of large variation of temperature, heat- conduction, compressibility of fluids and the evolution of free surface, loss of symmetries of equations, and loss of derivatives in closing the bootstrap argument which is a key feature compared with Christodoulou and Lindblad's work.