Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Dynamics and temperature evolution during droplet impacts on cold surface FENG WANG, MAN HU, DAOSHENG DENG, Fudan University, Shanghai, China — Droplet impacting on cold surface is significant for many practical situations in our daily life, such as anti-icing on wind turbines, aircraft and power transmission lines. By using high speed camera and thermal camera, here we report the dynamics and temperature evolution during water droplet impacts and freezes on cold metal surface. In the impact process, the maximum spread radius is found to have a 1/3 power law with the initial height, which is different from the impacting behavior at the room temperature. In the retraction process, three different morphology are indentified when changing the initial height from low to high, which is puddle, transition state and pancake. In the freezing process, the ice-water boundary and the zero degree isotherm are extracted from the high speed videos and thermal profiles. The ice-water boundary retraction speed is found to be slower than the zero degree isotherm, which indicates the subcooling freezing process.

Feng Wang
Fudan University, Shanghai, China

Date submitted: 01 Aug 2019 Electronic form version 1.4