

Small iron meteoroids: Observation and modeling of meteor light curves

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Iron meteoroids produce an important fraction of faint meteors. We ran a number of observational campaigns aimed at these meteors (including spectral observations) at relatively low heights in 2016-2018. We developed a simple numerical model of their ablation that assumes immediate spraying of liquid iron from the meteoroid surface as droplets with a Nukiyama-Tanasawa size distribution. The model is able to describe most of the observed light curves, including beginning height, position of maximum brightness, the length of the meteor, and its overall shape.

For an individual faint iron meteor, the model allows to estimate initial mass, mean drop size, and luminous efficiency. The fact that mass and luminous efficiency can be estimated independently is a unique feature of our model.