P143-001 **Room: 304** **Time: May 16 9:00-9:13**

Determining meteoroid properties from high-resolution radar observations

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We present a method for determining the position of a compact radar target with the tristatic EISCAT UHF radar in Northern Scandinavia as well as its applicability for meteor studies. The radar targets of

meteor head echoes appear at around 100 km altitude, are transient and highly Doppler shifted. A statistical evaluation of the measurement technique shows that the Doppler velocity of a meteor head echo agrees with the target range rate to about one part in 1000 with negligible biases. This demonstrates that no contribution from slipping plasma is detected and that the Doppler velocities are unbiased within the measurement accuracy. The inferred positions of the meteor targets have been used to estimate their velocities, decelerations, directions of arrival and radar cross sections with unprecedented accuracy. Meteor head echoes are detected at virtually all possible aspect angles all the way out to 130 degrees from the meteoroid trajectories, limited by the antenna pointing directions.

Traveling through the atmosphere, a meteoroid decelerates due to collisions with the atmospheric constituents. We have compared and fitted the precise particle deceleration obtained from the tristatic data to a single-body numerical ablation model in which test particles are propagated down through the atmosphere to our observation altitude using a fifth order Runge-Kutta numerical integration technique with a variable step size. Ablation is the collective term for several kinds of mass losses including vaporization, sublimation, fusion and loss of molten droplets. When estimating the masses of the observed meteoroids, we thus take into account that the mass of a meteoroid changes due to ablation during an observation. This method enables us to rate the atmospheric entry masses of the meteoroids as well as their remaining masses at the detection altitude. These two quantities are significantly different, i.e. significant mass loss occur already before detection. This circumstance is important to consider when evaluating meteoroid properties from meteor head echoes. The atmospheric entry mass distribution of the EISCAT UHF meteors ranges from 10ˆ-9 kg to 10ˆ-5.5 kg.