

## **RADAR STUDIES OF METEOROID-ATMOSPHERE INTERACTION PROCESSES**

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Meteor head echoes are radio wave reflections from the dense plasma created by and surrounding a meteoroid on its way through the atmosphere. Using the tristatic EISCAT UHF radar in northern Scandinavia, we have experimentally found that meteor head echo radar targets are virtually independent of aspect angle and confirmed that their Doppler velocity agrees with the target range rate with negligible biases. This demonstrates that no contribution from slipping plasma is detected and that the Doppler velocities are unbiased within the measurement accuracy. One of the long-term questions in meteor physics is how big a role fragmentation plays in the interaction processes of submillimeter-sized meteoroids with the atmosphere. We show that regular pulsations in received power of meteor head echoes observed with the EISCAT radars are a signature of interference from multiple fragments. This study is currently being extended using the Shigaraki MU radar in Japan and simultaneous ICCD video observations. Fragmentation may be taking place on a too small scale for individual fragments to be observable optically, but the effect of fragmentation on the optically observed luminosity can be examined using its signature in the radar data. Statistical studies of fragmentation provide information about meteoroid structural components. These are useful in distinguishing physical differences between various meteoroid populations and contribute to our understanding of the fate of the meteoric material in the atmosphere.

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