

Ultra-high precision meteor trajectories obtained using the Canadian Automated Meteor Observatory tracking system

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The Canadian Automated Meteor Observatory (CAMO) tracking system is an electro-optical meteor observation system which uses a pair of 50-mm mirrors and a telescope for tracking meteors in real time at 100 frames per second. This system achieves an effective astrometric precision of < 1 arc second, which translates to a spatial precision of ~ 1 m at 100 km. The Western Meteor Physics Group operates two of these systems 50 km apart, observing the same volume of the sky. In this work we discuss a new novel method of data reduction and trajectory estimation designed to both minimize and quantify errors in individual orbits computed with CAMO data. We have developed a synthetic model to verify the expected accuracy of measured radiant and velocities, and show that the accuracy is sufficient to measure the true physical radiant dispersion of meteor showers. Finally, we show examples of observed meteors and details of reductions.