

14TH IAA SYMPOSIUM ON SPACE DEBRIS (A6)
Measurements (1)

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BROADBAND ARRAY SPECTROGRAPH SYSTEM (BASS) THERMAL IR OBSERVATIONS OF
NAK DROPLETS IN LOW EARTH ORBIT (LEO)**Abstract**

There exists a population of sodium-potassium (NaK) droplets in 900-950 km altitude orbits. These droplets are the result of former Soviet Union ocean reconnaissance nuclear-powered satellites ("ROR-SAT") reactor-core ejections. The droplets come from the NaK that was the liquid metallic coolant for the reactor cores, and the droplets have been measured by radar to have sizes up to 6 cm diameter.

Previously, the droplets had been observed in the visible and radar bands, and droplet formation had been modeled. In this work, we report on the first long-wave thermal IR observations of NaK droplets, taken with the Broadband Array Spectrograph System (BASS), in both the IR (3-13 μ m), as well as the visible. Due to their small size (6 μ m), we find the droplets to be at the limits of our ability to characterize, even using a 4-meter class telescope. We have, however, measured the spectra of the droplets, and from the spectra we have estimated the temperature and the emissivity-area product. We find the temperatures to be above freezing for NaK, and if we assume sizes for these objects as published previously from radar observations, we find an emissivity of 60