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Relationship between in-situ detection of dust grain impacts and the interplanetary magnetic field

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Dust grains hitting solid bodies at velocities in the range of 10–100 km/s are known to generate transient plasma clouds of both vaporized grain and a affected surface of the object. These ejected charged particles could be detected using fast and sensitive current measurement apparatus. We have searched for such events recorded by the BMSW instrument, which consists of 6 Faraday cups operated at 30 Hz, onboard the SPEKTR-R spacecraft orbiting the Earth since 2011.

We have successfully identified a large amount of events of expected properties. Our expectations are based upon our laboratory simulations on an engineering model of the BMSW instrument using the dust accelerator facility. We have studied a correlation between directional and amplitude distributions of dust impacts and expected distributions/known models of the interplanetary dust. Furthermore, we have also studied of these events with respect to the surrounding space conditions, e.g., the orientation and strength of the interplanetary magnetic field. We present the results of our analyses.