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Dust Grain Detection by Solar Orbiter, Parker Solar Probe, and Magnetospheric Multiscale (MMS) Mission — Similarities and Differences

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The dust impact detection by electric field instruments is already a well-established technique. On the other hand, not all aspects of signal generation by dust impacts and its consequent detection are completely understood and explained. It has been shown that the design and configuration (monopole/dipole) of the electric field antennas/probes are very important for dust impact detection and understanding of the measured signal. Therefore, it is not straightforward to compare detected signals by various spacecraft. Most of space missions use at the same time either monopole or dipole antenna configuration. However, the MMS simultaneous monopole and dipole measurements provide us with interesting information about dust impact signals. We have analyzed individual electric field waveforms of dust impacts detected by Solar Orbiter, Parker Solar Probe, and MMS to understand similarities and differences of dust detection by various spacecraft with different antenna designs and configurations. This understanding will allow us to reliably compare obtained dust fluxes among individual missions.