Measurements of circumsolar dust accumulation around Earth and Venus orbits by the IKAROS-ALADDIN

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The ALADDIN (Arrayed Large-Area Dust Detectors in INterplanetary space) is an in-situ impact dust detector onboard a solar power sail demonstrator "IKAROS (Interplanetary Kite-craft Accelerated by Radiation Of the Sun)". The IKAROS was launched in May 2010 and its mission has been continued beyond its nominal lifetime orbiting the Sun between Earth and Venus orbits (approx. 0.7-1.0 AU).
According to the trajectory of IKAROS it is suggested that the ALADDIN could detect circumsolar dust accumulation (ring and blob) around Earth and Venus orbits previously observed by several probe for zodiacal light and infrared remote sensing e.g. Helios and COBE. Furthermore, because of ALADDIN's larger detection area (0.54 m^2), which provides higher statistical accuracy of flux value than that of previous in-situ dust detectors, the observation results of ALADDIN may clearly distinguish a flux enhancement due to circumsolar dust accumulation from the background of interplanetary dust distribution, which was difficult to be done by the past in-situ measurements with small detection area. To verify whether the ALADDIN detected the accumulation or not we compared the results from the ALADDIN and the past dust measurements conducted by both of remote sensing and in-situ detection. We report here progress in the ALADDIN observations of circumsolar dust accumulation around these two planets' orbits.
The ALADDIN sensor has 8 channels of 9 and 20-micron-thick PVDF (polyvinylidene fluoride) film. The detection threshold is approximately 10^{-10} g in particle mass (several to tens micron in particle diameter at 2.5 g/cc) with impact velocity above 1 km/s. Its cruising measurements from June 2010 to October 2011 counted nearly 3000 dust impact events.