

Dust measurements by the Student Dust Counter on-board the New Horizons mission

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The Student Dust Counter (SDC) experiment of the New Horizons Mission is an impact dust detector to map the spatial and size distribution of dust along the trajectory of the spacecraft across the solar system. The sensors are thin, permanently polarized polyvinylidene fluoride (PVDF) plastic films that generate an electrical signal when dust particles penetrate their surface. SDC is capable of detecting particles with masses $m > 10^{-12}$ g, and it has a total sensitive surface area of about 0.1 m^2 , pointing most of the time close to the ram direction of the spacecraft. SDC is part of the Education and Public Outreach (EPO) effort of this mission. The instrument was designed, built, tested, integrated, and now is operated by students. SDC provides the first dust measurements beyond 18 AU, where the Pioneer sensors stopped working. After the Pluto-Charon fly-by, SDC will continue to measure dust on into the Kuiper Belt. These observations will advance our understanding of the origin and evolution of our own solar system, and allow for comparative studies of planet formation in dust disks around other stars. This talk will briefly review the SDC instrument [1], and the most recent data, including comparisons between these and measurements taken by Ulysses and Galileo [2]. We will also discuss the constraints on the dust production rate in the Kuiper Belt, based on SDC observations [3].

References:

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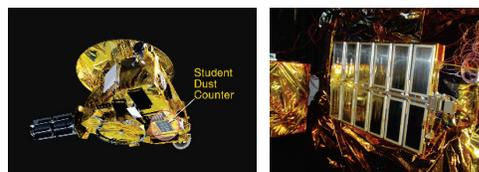


Figure 1: SDC is facing in the ram direction of New Horizons (left), and it consists of 12 sensor units, each with a surface area of $\sim 100 \text{ cm}^2$ (right). Additionally, SDC carries two reference detectors that are not exposed to dust.

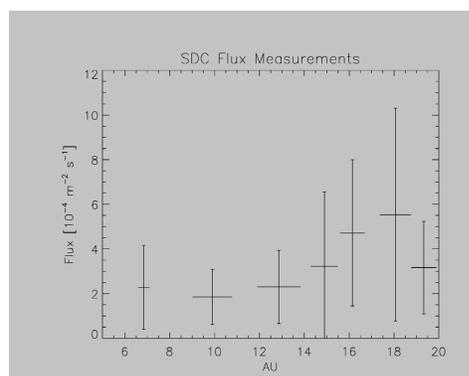


Figure 2: Dust flux measured by SDC as of May 2011.