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Dust, Field and Plasma instrument onboard ESA's Comet Interceptor mission

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The main goal of ESA's F-1 class Comet Interceptor mission is to characterise, for the first time, a long period comet; preferably a dynamically-new or an interstellar object. The main spacecraft, will have its trajectory outside of the inner coma, whereas two sub-spacecrafts will be targeted inside the inner coma, closer to the nucleus. The flyby of such a comet will offer unique multipoint measurement opportunity to study the comet's dusty and ionised environment in ways exceeding that of the previous cometary missions, including Rosetta.

The Dust Field and Plasma (DFP) instruments located on both the main spacecraft A and on the sub-spacecraft B2, is a combined experiment dedicated to the in situ, multi-point study of the multi-phased ionized and dusty environment in the coma of the target and its interaction with the surrounding space environment and the Sun.

The DFP instruments will be present in different configurations on the Comet Interceptor spacecraft A and B2. To enable the measurements on spacecraft A, the DFP is composed of 5 sensors; Fluxgate magnetometer DFP-FGM-A, Plasma instrument with nanodust and E-field measurements capabilities

DFP-COMPLIMENT, Electron spectrometer DFP-LEES, Ion and energetic neutrals spectrometer DFP-SCIENA and Dust detector DFP-DISC. On board of spacecraft B2 the DFP is composed of 2 sensors: Fluxgate magnetometer DFP-FGM-B2 and Cometary dust detector DFP-DISC.

The DFP instrument will measure magnetic field, the electric field, plasma parameters (density, temperature, speed), the distribution functions of electrons, ions and energetic neutrals, spacecraft potential, mass, number and spatial density of cometary dust particles and the dust impacts.

The full set of DFP sensors will allow to model the comet plasma environment and its interaction with the solar wind. It will also allow to describe the complex physical processes including wave particle interaction in dusty cometary plasma.