

PLASMA INSTRUMENTATION AT SWRI

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INSTRUMENT MEASUREMENT GOALS	PHOTO	MEASUREMENT PERFORMANCE	FIELD-OF-VIEW	DATA EXAMPLES	RESOURCES	REFERENCE
JADE-I (Jovian Auroral Dynamics Experiment - Ions)		Energy Range 0.01 to 50 keV ΔE / E 0.28 to 0.18 Species Ions from 1 to >64 amu/q M/ΔM 2.5 to 11 (energy dependent)	Instantaneous FOV – 270 × 8.5 Full FOV – 4π steradians each spin Geometric Factor – $5 \times 10^{-3} \text{ cm}^2 \text{ sr eV/eV}$		7.552 kg (including radiation shielding) 1.9 Watts	McComas, D. J., et al. (2013), The Jovian Auroral Distributions Experiment (JADE) on the Juno mission to Jupiter, <i>Space Sci. Rev.</i> , pp. 1–97, doi: 10.1007/s11214-013-9990-9.
JADE-E (Jovian Auroral Dynamics Experiment - Electrons)		Energy Range 0.10 to 95 keV ΔE / E 0.104 to 0.132 Species Electrons	Instantaneous FOV – 360 × 3 to 6 for three sensors Deflection of +/- 35 to keep magnetic field in FOV Geometric Factor – $5 \times 10^{-5} \text{ cm}^2 \text{ sr eV/eV}$		5.24 kg per sensor (including radiation shielding) 1. Watt per sensor	McComas, D. J., et al. (2013), The Jovian Auroral Distributions Experiment (JADE) on the Juno mission to Jupiter, <i>Space Sci. Rev.</i> , pp. 1–97, doi: 10.1007/s11214-013-9990-9.
SWAP (Solar Wind Around Pluto)		Energy Range .035 to 7.5 keV/q (ions and electrons) ΔE / E 0.085, integrated RPA to allow for higher energy resolution Species Ions	Instantaneous FOV – 276 × 10 Deflection of + 15 Geometric Factor – $1.3 \times 10^{-2} \text{ cm}^2 \text{ sr eV/ eV}$ (ions and electrons)		3.29 kg 2.84 Watts	McComas, D., et al. (2008), The Solar Wind Around Pluto (SWAP) instrument aboard New Horizons, <i>Space Sci. Rev.</i> , 140, 261–313, 10.1007/s11214-007-9205-3.
HPCA (Hot Plasma Composition Analyzer)		Energy Range .01 to 40 keV ΔE / E ≤ 0.2 FMWM Species Mass resolved ions 1 to 16 amu / q M/ΔM ~ 4	Instantaneous FOV – 360 × 11.25 Full FOV – 4π steradians in half spin Geometric Factor – $3 \times 10^{-3} \text{ cm}^2 \text{ sr keV/keV}$		8.91 kg 15.48 Watts (Fast Survey) 10.43 Watts(Slow Survey)	Young, D., et al. (2014), Hot Plasma Composition Analyzer for the Magnetospheric Multiscale Mission, <i>Space Science Reviews</i> , pp. 1–64, doi: 10.1007/s11214-014-0119-6.
CAPS (Cassini Plasma Spectrometer)		Energy Range .0006 – 28.25 keV (ELS), .001 – 49.8 (IBS), .001 – 50.28 (IMS) ΔE / E 0.17 (ELS), 0.014 (IBS), 0.17 (IMS) Species electrons (ELS), ion (IBS), Mass resolved ions (IMS) M/ΔM ~ 70 (IMS)	Mounted on a actuator that scan half the sky every 3 minutes		23 kg 21.0 Watts (Peak) 16.4 Watts (Average)	Young, D., et al. (2004), Cassini plasma spectrometer investigation, <i>Space Science Reviews</i> , 114(1–4), 1–112, doi: 10.1007/s11214-004-1406-4.
IES (Ion and Electron Spectrometer)		Energy Range .001 to 22 keV/q (ions and electrons) ΔE / E 0.08 Species Ion and electrons is single sensor	Instantaneous FOV – 360 × 5 Deflection of +/- 45 Geometric Factor – $5 \times 10^{-4} \text{ cm}^2 \text{ sr eV/ eV}$ (ions and electrons)		1.04 kg 1.85 Watts	Burch, J. L., R. Goldstein, T. E. Cravens, W. C. Gibson, R. N. Lundin, C. J. Pollock, J. D. Winningham, and D. T. Young (2006), RPC-IES: The ion and electron sensor of the Rosetta plasma consortium, <i>Space Sci. Rev.</i> , 128, 697–712, doi: 10.1007/s11214-006-9002-4.
PEPE (Plasma Experiment for Planetary Exploration)		Energy Range .003 to 30 keV/q (ions), 0.01 to 10 keV (electrons) ΔE / E 0.05 Species Ion and electrons is single sensor, ions 1 – 136 amu/q M/ΔM ~ 4 (straight thru), ~20 (Linear Electric Field)	Instantaneous FOV – 360 × 5 Deflection of +/- 45 Geometric Factor – $1.5 \times 10^{-4} \text{ cm}^2 \text{ sr (electrons, 5x22 pixel)}, 8 \times 10^{-5} \text{ cm}^2 \text{ sr (ions, 5x22 pixel)}$		5.5 kg 9.6 Watts	Young, D. T., et al. (2007), Plasma experiment for planetary exploration (PEPE), <i>Space Science Reviews</i> , 129 (4), 327 – 357, doi: 10.1007/s11214-007-9177-3.
ASPERA-3 IMA (Ion Mass Analyzer)		Energy Range 0.01 to 20 keV/q ΔE / E 0.07 Species m/q = 1,2,4,8,16 >20	Intrinsic FOV 90 × 360 (w/ deflection) Geometric Factor – $3.5 \times 10^{-4} \text{ cm}^2 \text{ sr per } 4.5 \times 22.5 \text{ pixel}$		2.2 kg 3.5 Watts	Barabash, et al., ASPERA-3: Analyser os Space Plasmas and Energetic Ions for Mars Experes, ESA Special Publication SP-1240, MARS EXPRESS - The Scientific Payload, http://sci.esa.int/mars-express/34885-esa-sp-1240-mars-express-the-scientific-payload
ASPERA-3 ELS (Electron Spectrometer)		Energy Range 0.01 to 20 keV/q ΔE / E 0.08 Species electrons	Intrinsic FOV 10 × 360 Geometric Factor – $5 \times 10^{-4} \text{ cm}^2 \text{ sr per } 10 \times 22.5 \text{ pixel}$		0.3 kg 0.6 Watts	Barabash, et al., ASPERA-3: Analyser os Space Plasmas and Energetic Ions for Mars Experes, ESA Special Publication SP-1240, MARS EXPRESS - The Scientific Payload, http://sci.esa.int/mars-express/34885-esa-sp-1240-mars-express-the-scientific-payload