First Observations from the ASPERA-3 ELS in the Mars Ionosphere

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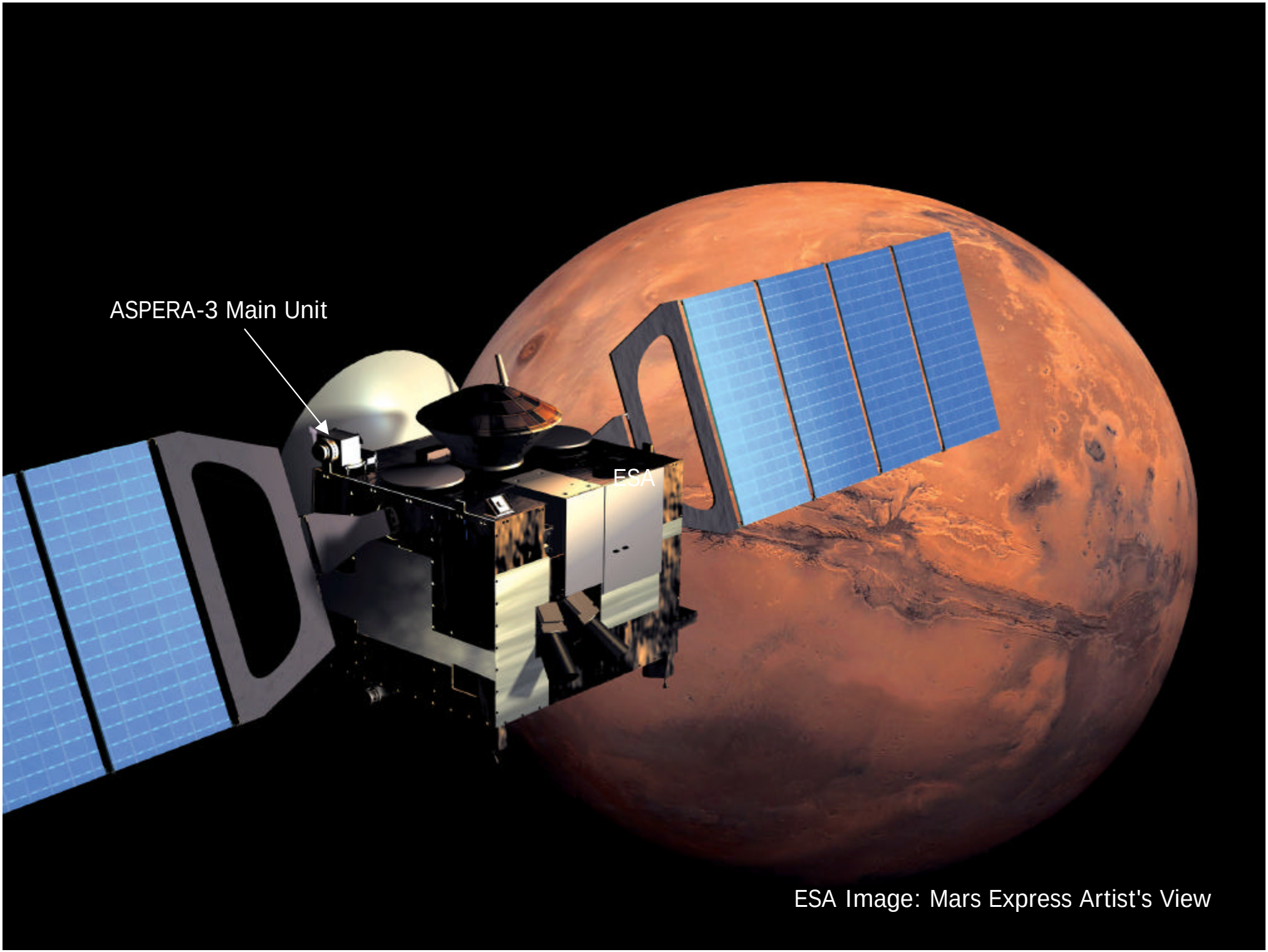
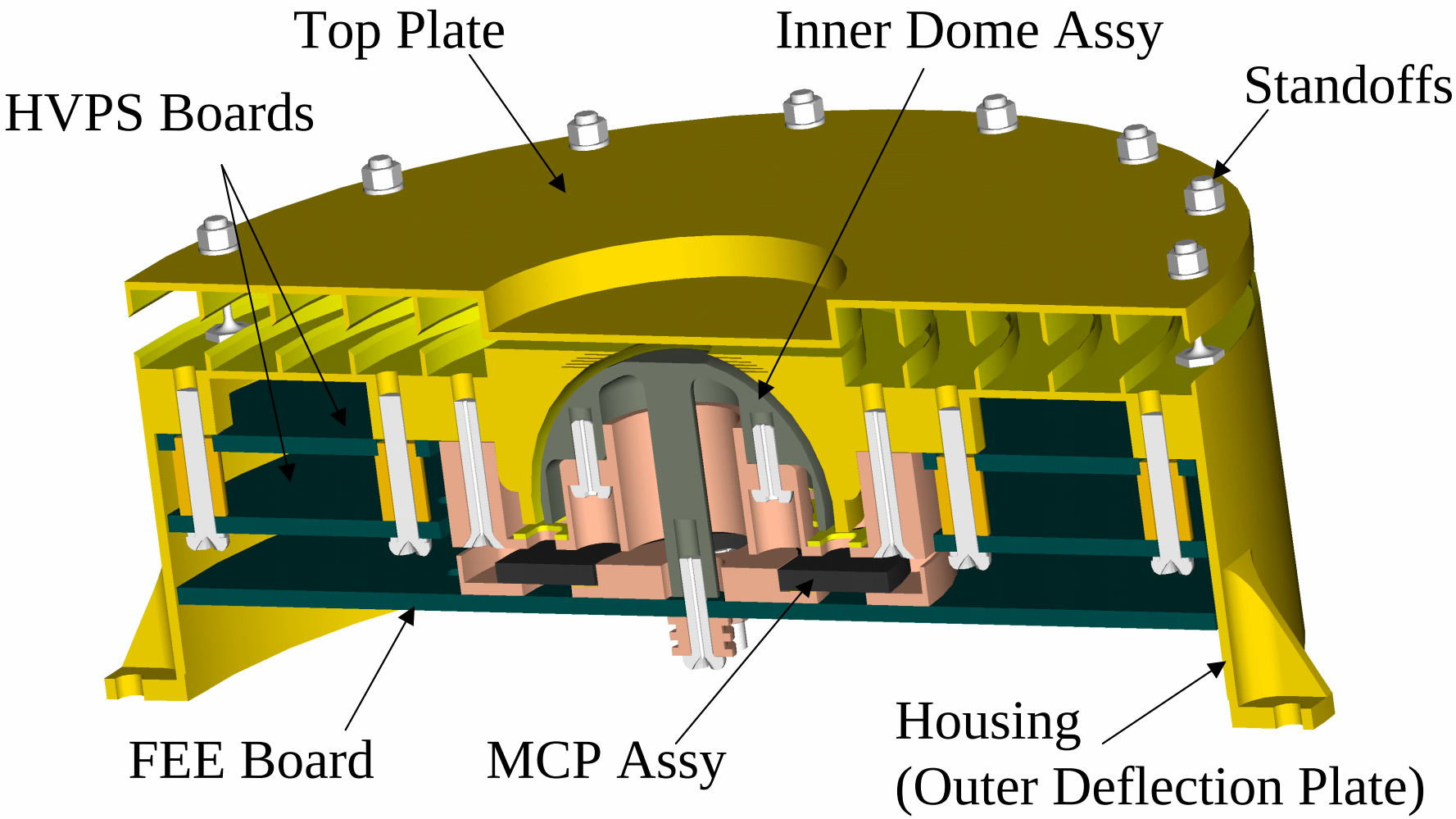


ESA Image: Mars Express Artist's View

Electron Spectrometer (ELS) Cross Section



ELS Objectives

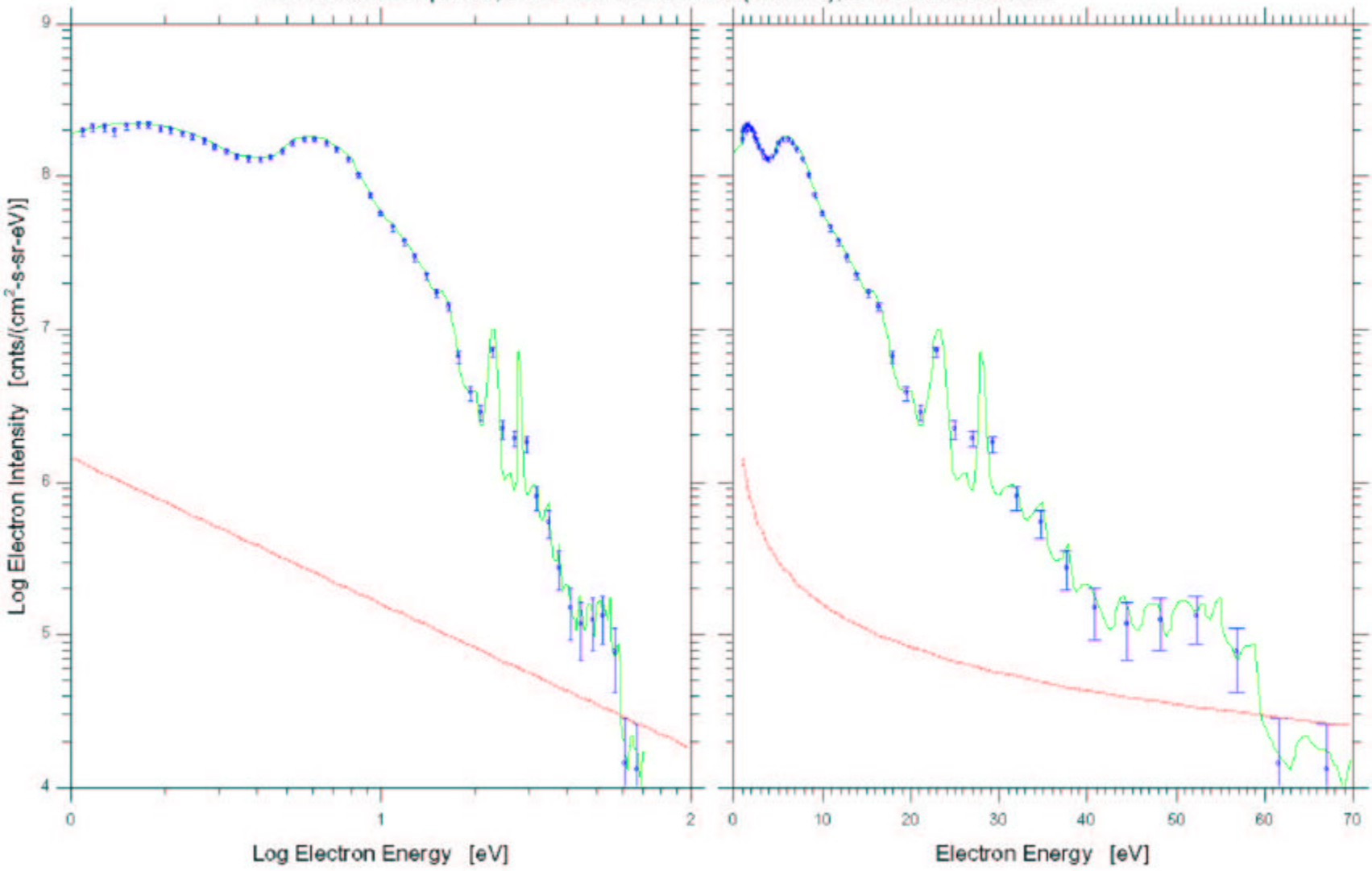
- Complement the ENA images
  - Provide solar wind parameters necessary for interpretation of ENA images
  - Provide in situ diagnostics of plasma environment

- Study local characteristics of plasma
  - Dynamics and structure of boundaries
  - Major photoelectron peak(s)

Expected Mars Photoelectron Spectrum at 145 km

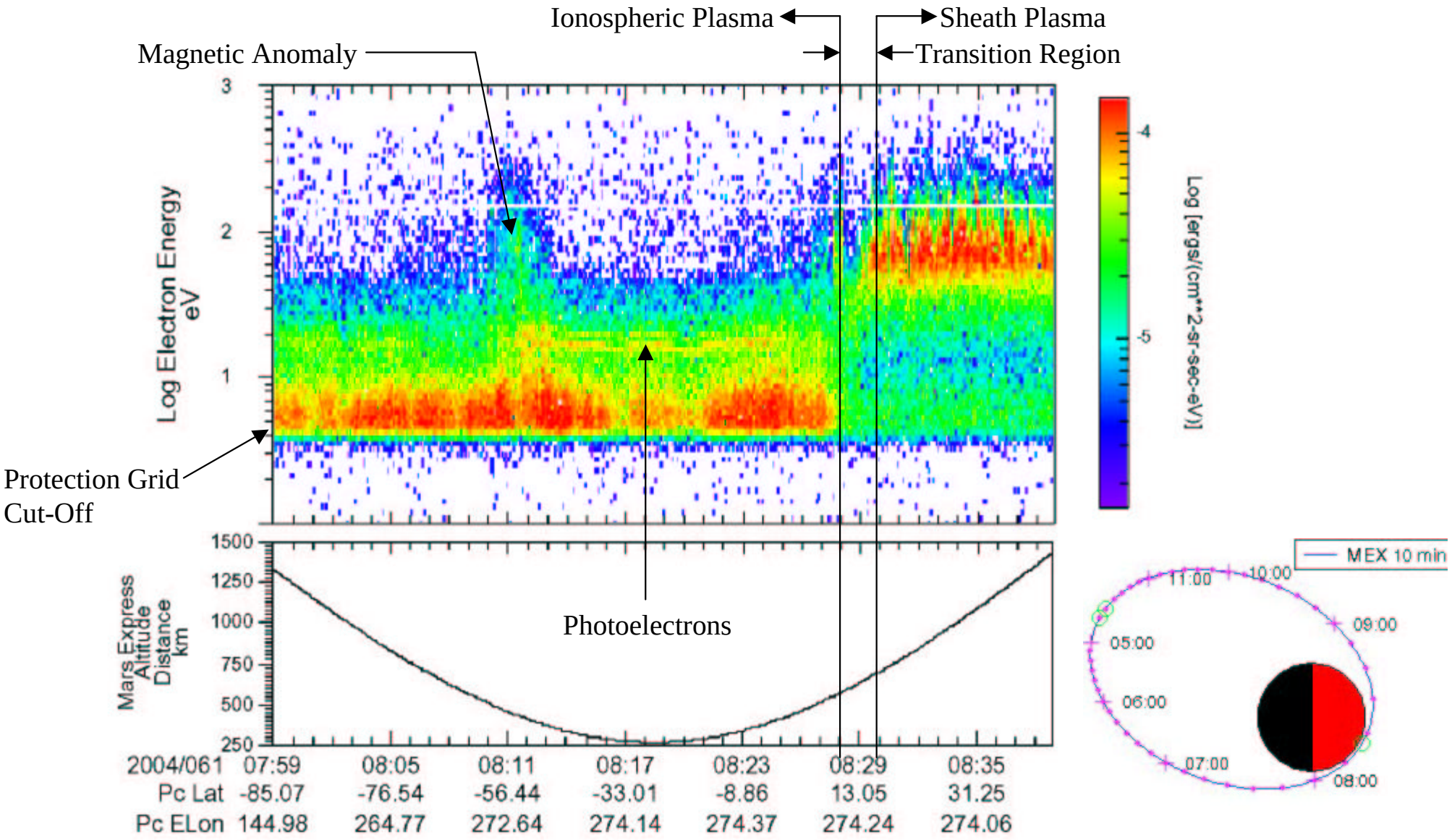
from the ASPERA-3 Electron Plasma (ELS) Instrument

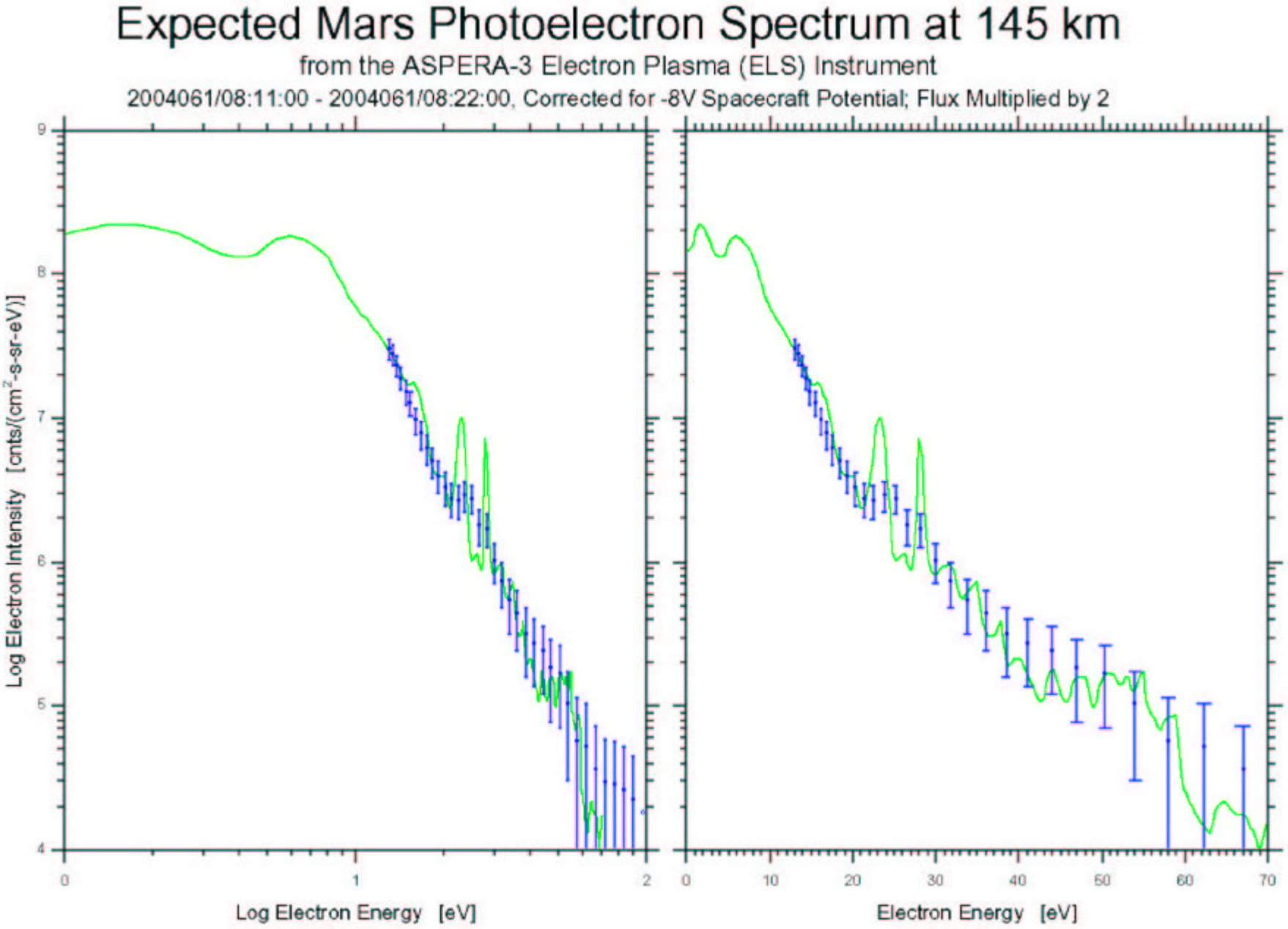
Instrument Response, Instrument Threshold (2 count), and Poisson Errors



Mantas and Hansen, 1979

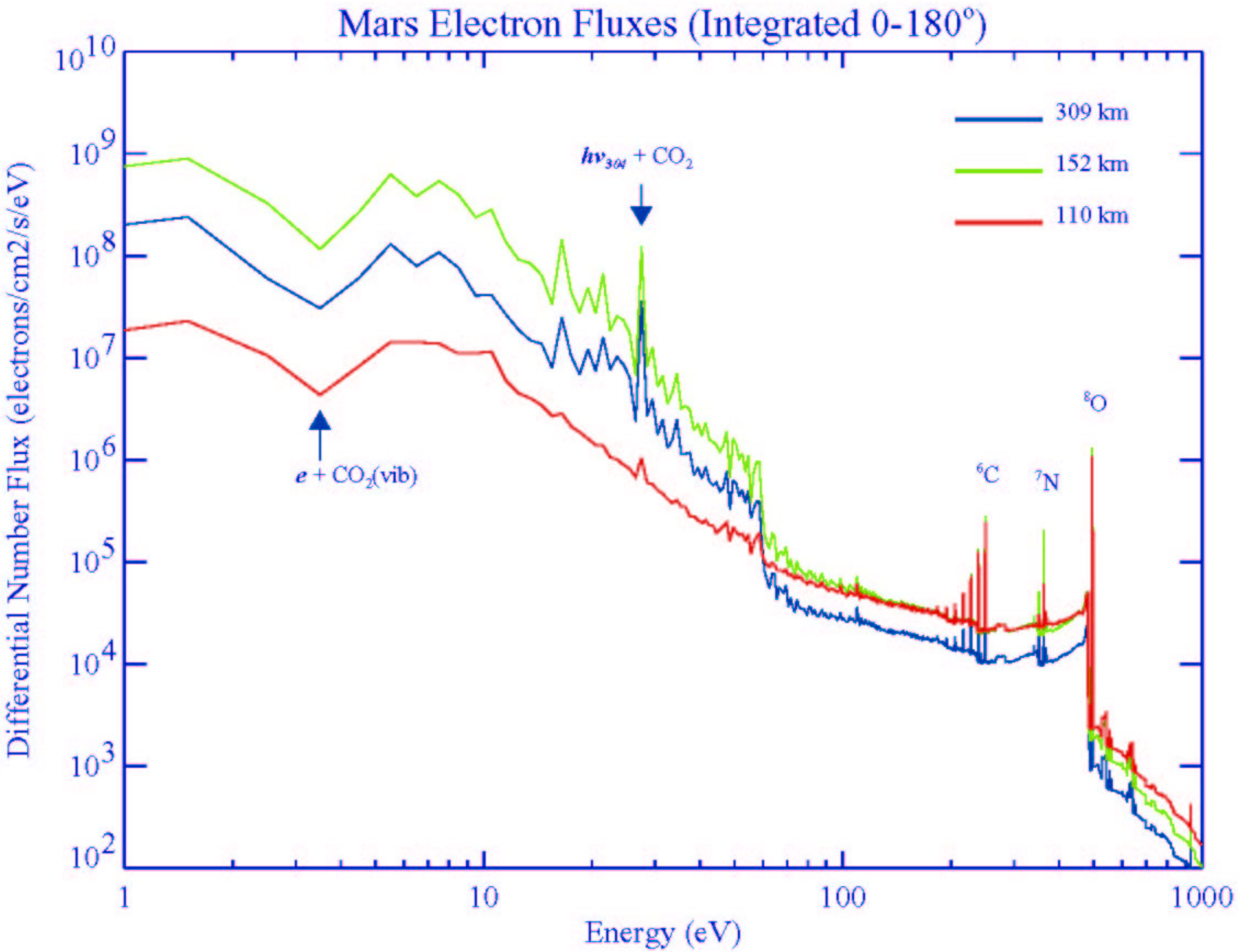
Electrons in the Mars Ionosphere



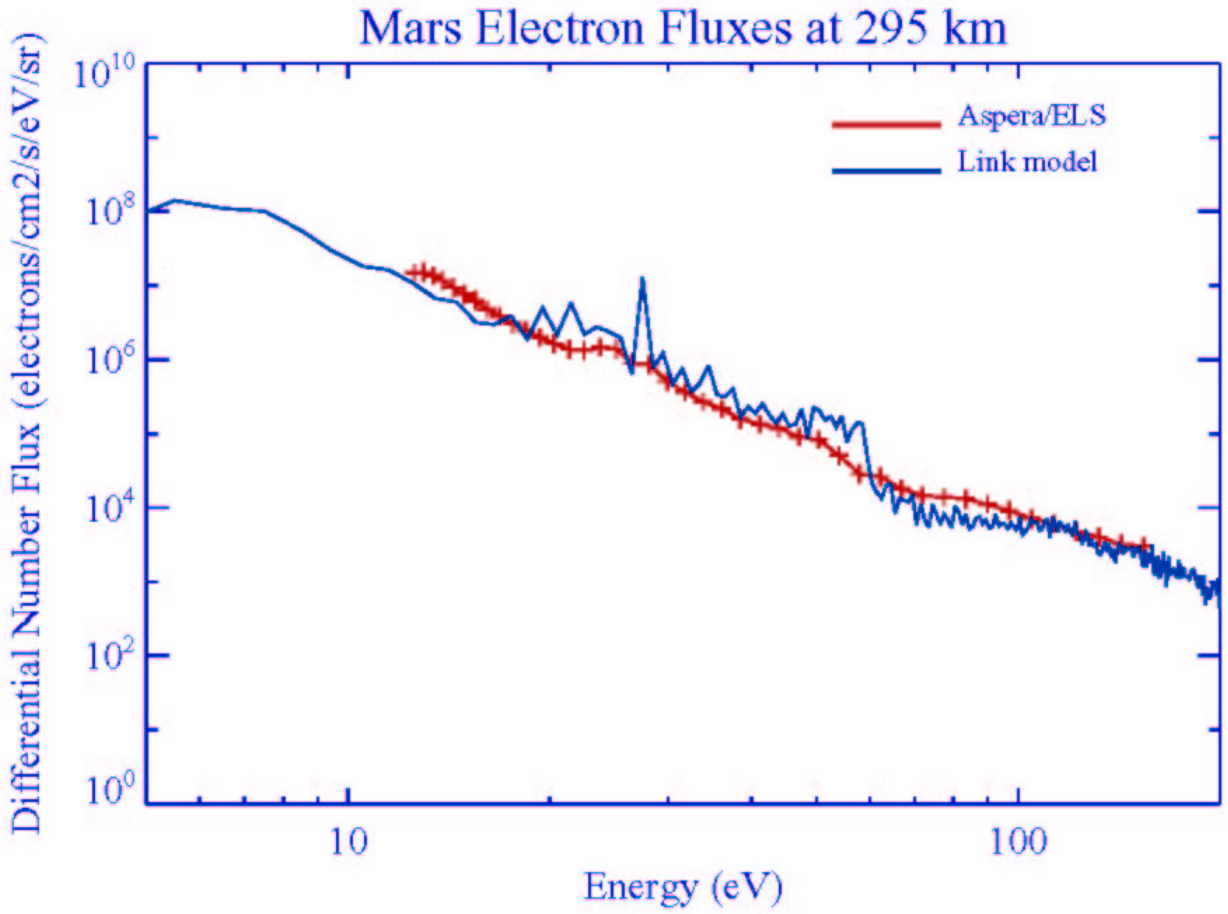


Mantas and Hansen, 1979

Mars Photoelectron Spectrum



Comparison with results from Multistream Boltzman Transport code based on Link, 1992



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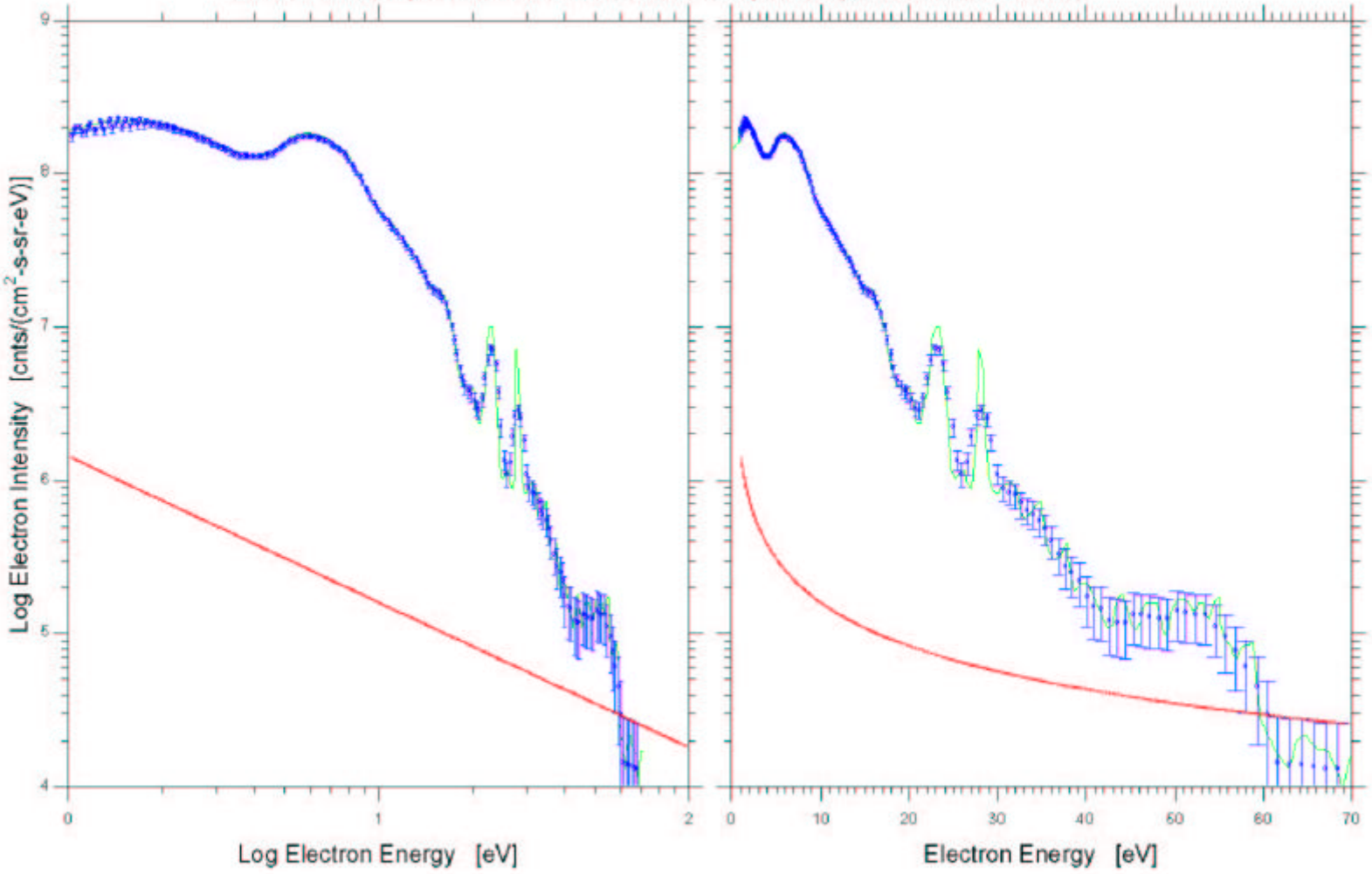

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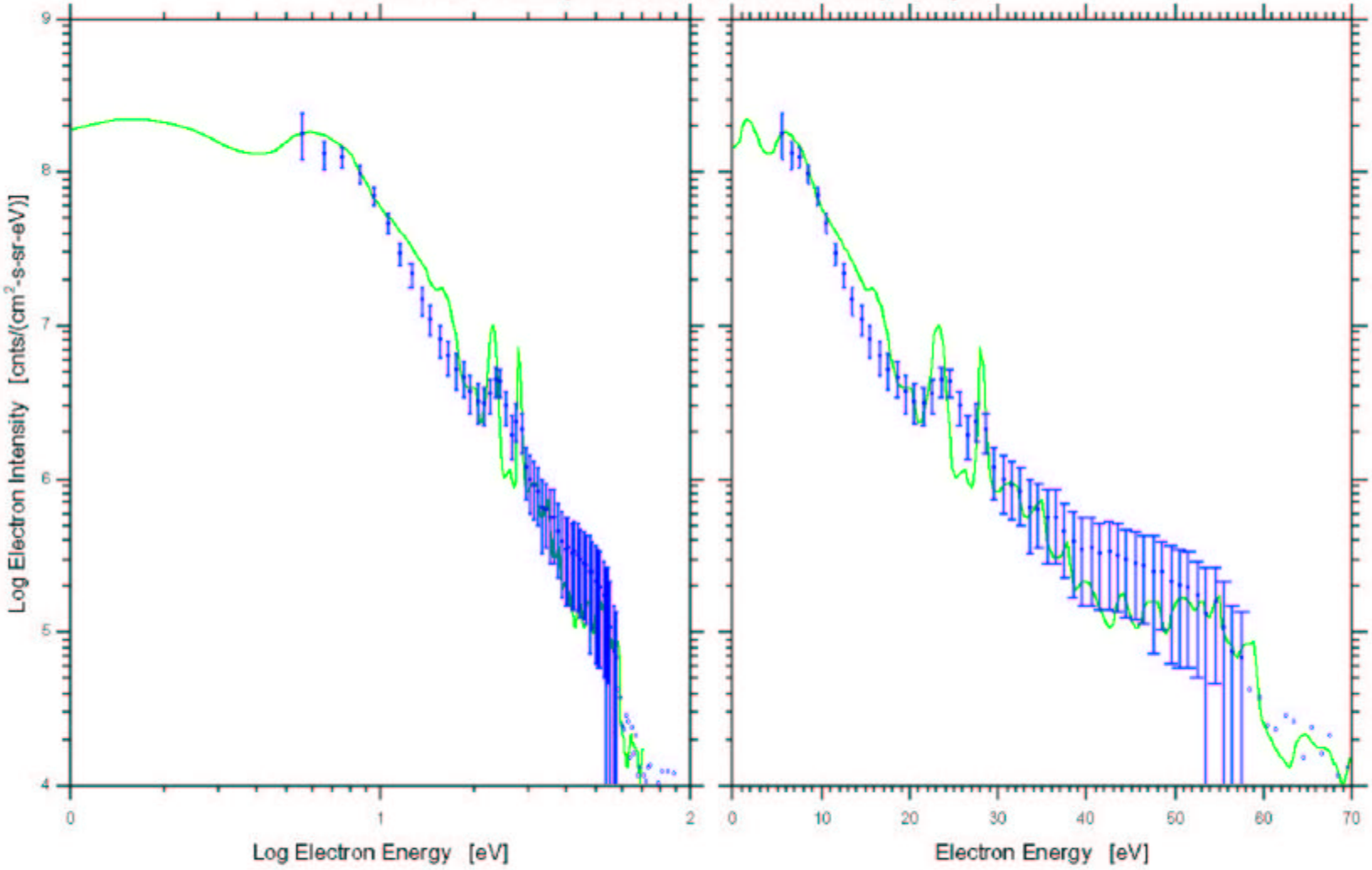
from the ASPERA-3 Electron Plasma (ELS) Instrument

Corrected for -4.6V Spacecraft Potential; Flux Multiplied by 4



Conclusions

- Contiguous Resolution is Adequate to Show Major Photoelectron Peak(s)
- ELS Spectrum in Mars Ionosphere Shows Major Photoelectron Peak(s)
- Contiguous Resolution of Electrons Measured by ELS Fit Major Photoelectron Peaks which are Predicted by Mantas & Hanson as well as Link
- Oversampling of Photoelectrons Should Resolve the Quantity of Peak(s) and Allow Distinction Between some Martian Photoelectron Models