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Photodetachment rates

1st year project - 201

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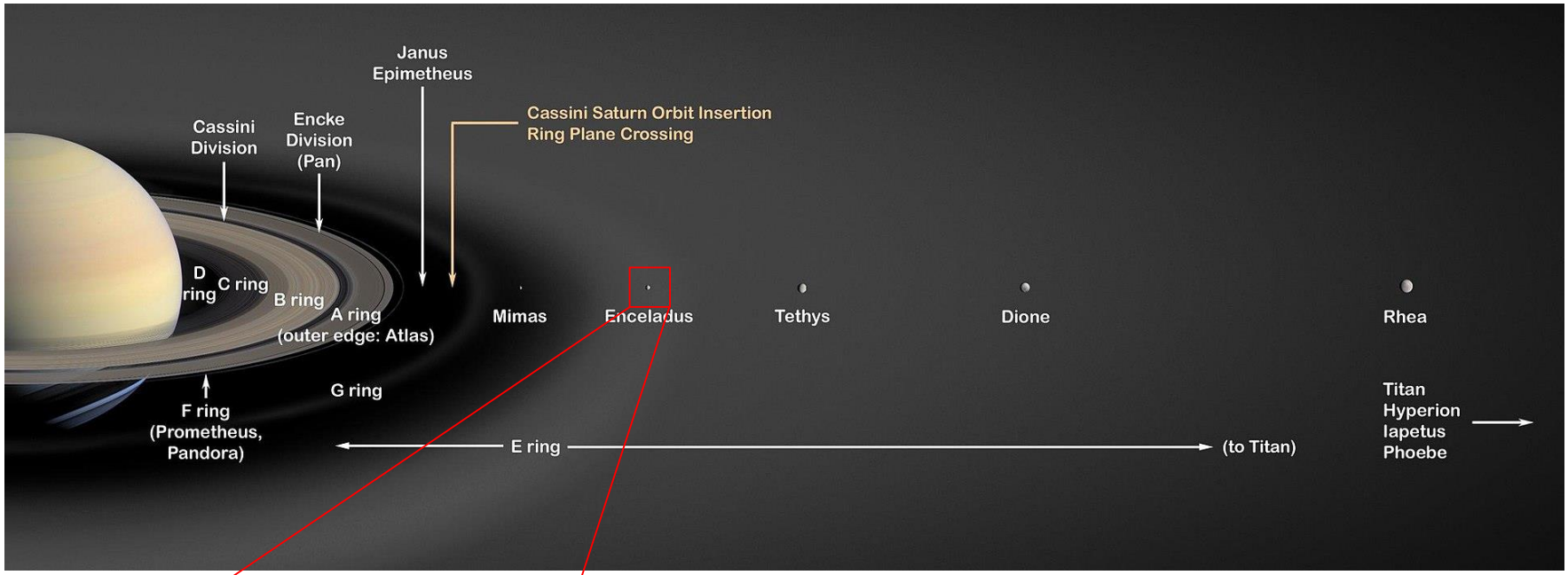
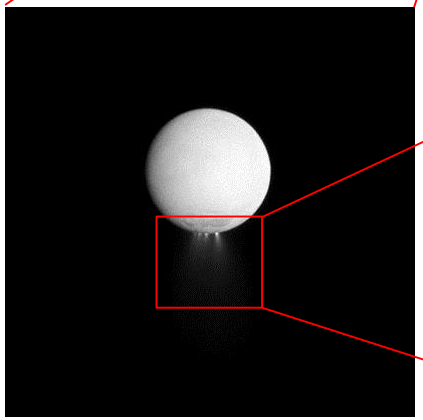
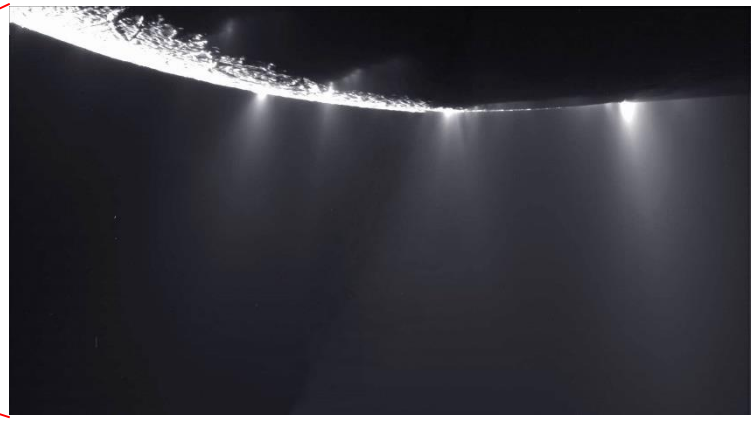
The Plumes of Enceladus emit ~100 kg/s of water







Negative ions O-, OH-, H20- detected in the plumes (Coates+ 2009)

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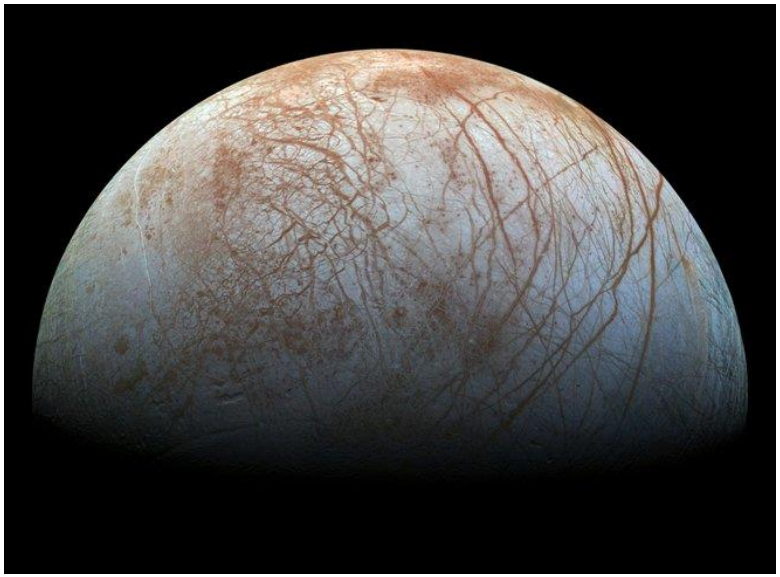
Negatively charged Chlorine at Europa



- Negatively charged Chlorine has been inferred to exist at Europa (Volwerk+ 2001; Desai+ 2017), and indicate a salt-rich (NaCl) sub-surface water ocean, a phenomena so far only observed in the Earth's oceans
  - But how long do Cl- anions exist for?

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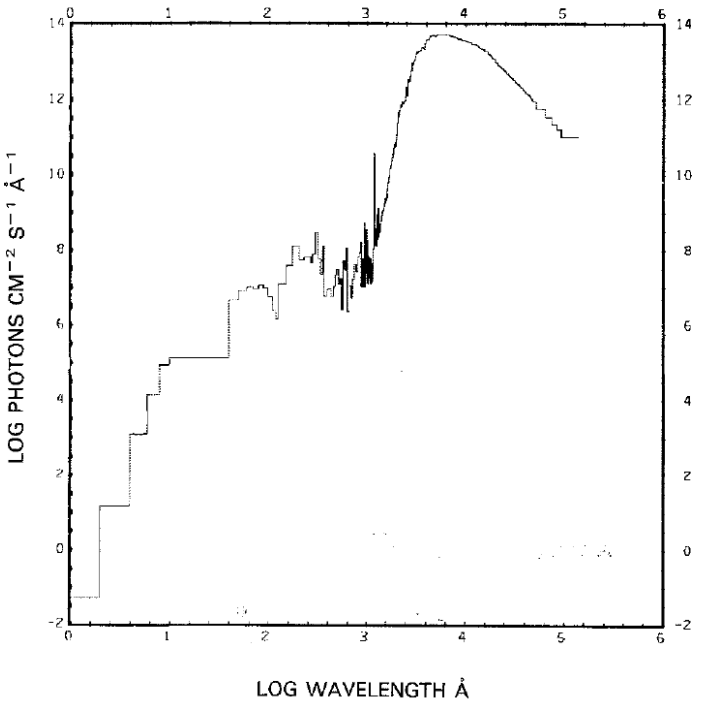
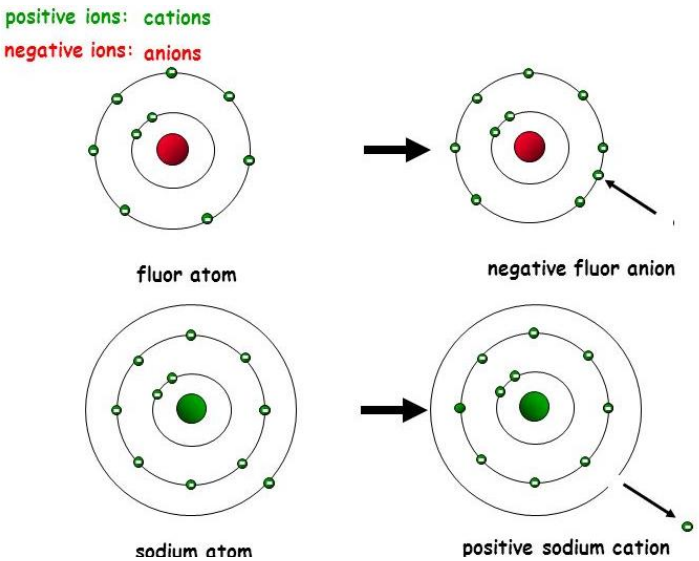
Photodetachment reaction

Solar photons can be absorbed by an anion which results in the emission of an electron





See Huebner et al. (1992)

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Aim

1. Import the solar spectrum into python/matlab/mathematica from Huebner+ 1992

2. Read the Huebner+ (1992) Section 1, Section 2, and first couple of pages of Section 3. to understand how to calculate photodetachment rates

3. Review the literature and find H- cross sections as a function of wavelength (google scholar good place to start)

4. Reproduce the H- rate of 14/s.

5. Find cross section for Cl-