

# Space Physics & Astrophysics Seminar

Thursday, February 1, 2018

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Boston University CSP



## *An Ionospheric Signature of Life on Exoplanets*

The ionized form of atomic oxygen ( $O^+$ ) is the dominant ion species at the altitude of maximum electron density in only one of the many ionospheres in our solar system—Earth's. This ionospheric composition would not be present if oxygenic-photosynthesis was not an ongoing mechanism that continuously impacts the terrestrial atmosphere. We propose that dominance of ionospheric composition by  $O^+$  ions at the altitude of maximum electron density can be used to identify a planet in orbit around a solar type star where global-scale biological activity is flourishing. There is no absolute numerical value required for this suggestion of an atmospheric plasma biomarker—only the dominating presence of  $O^+$  ions at the altitude of peak electron density. Issues to be discussed are biomarkers for planets orbiting M-Dwarf stars, the challenges of detection and problems of false positives.

4:00pm in CAS 502. Refreshments to follow in CAS 500.

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**Next Week**  
Monday 2/5  
Sarah Hörst  
JHU