Abstract Submitted
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**A novel merged beam apparatus to study the cosmic origins of organic chemistry**[1] AODH P. O'CONNOR, MAURICIO GARRIDO, KENNETH A. MILLER, DANIEL W. SAVIN, Columbia University, XAVIER URBAIN, Universite catholique de Louvain — We are constructing a novel merged-beams apparatus to study the cosmic origins of organic chemistry. With this, we plan to measure reactions of atomic C with molecular ions. Rate coefficients for such reactions are a critical component of the astrochemical models used to predict interstellar molecular abundances and to analyze spectroscopic observations of molecule-bearing cosmic sources. Initial studies will focus on $C + H_3^+ \rightarrow CH^+ + H_2$ reactions, an important first step in leading to interstellar organic chemistry. Starting with a $C^-$ beam, we will use laser photodetachment to generate a C beam; the residual $C^-$ will then be removed leaving a pure neutral beam. Subsequently an $H_3^+$ beam will be merged with the C beam. Since the beams will be co-propagating, we will be able to study reactions down to collision energies of the order of ten meV ($\leq$ 140 K). Reactions will be studied using an electrostatic analyzer to separate and detect the charged end products, allowing us to determine absolute reaction cross sections.

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