Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Cross sections for vibronic excitation and dissociative recombination of CH^+ by low-energy.[1] MEHDI AYOUZ, XIANWU JIANG, Ecole Centrale Paris, CHI HONG YUEN, University of Central Florida, SMANTHA DOUGUET, Rollins College, PIETRO CORTONA, Ecole Centrale Paris, VIATCHESLAV KOKOOULINE, University of Central Florida, KOKOOULINE COLLABORATION, DOUGUET COLLABORATION — A theoretical approach for the electron-impact vibronic excitation and dissociative recombination of molecular ions with low-lying excited electronic states is described. In this approach, the fixed-nuclear R-matrix method is employed to compute electron-ion scattering matrices and a vibronic frame transformation combined to the closed-channel elimination procedure are employed to construct an energy-dependent scattering matrix describing interactions between vibronic channels of the target ion induced by the incident electron. The approach is applied to CH^+ ion of an astrophysical and technological interest. Cross sections for vibronic excitation for different combinations of initial and final vibronic states and dissociative recombination are computed, accounting for Rydberg series of vibronic resonances in the collisional spectrum. A good agreement between electronic-excitation cross sections, obtained using the quantum defect theory and in a direct R-matrix calculation, demonstrates that the present approach provides a reliable tool for determination of vibronic (de-)excitation and dissociative recombination cross sections for targets with low-energy electronic resonances.

[1]NSF Grant No. PHY-1806915, Thomas Jefferson Funds, Appel projets Oser ! (Initiatives Pedagogiques) of Universite Paris Saclay

MEHDI AYOUZ
Ecole Centrale Paris

Date submitted: 31 Jan 2020 Electronic form version 1.4