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Laser ablation molecular spectroscopy of radium monofluoride JOSHUA ABNEY, MATTHEW DIETRICH, Argonne National Laboratory — The diatomic molecule radium monofluoride (RaF) is a promising candidate for a molecular probe of physics beyond the Standard Model. In particular the large nuclear octupole deformation and heavy mass of radium enables electric dipole moment (EDM) measurements that are highly sensitive to CP violation within the nucleus. Additionally, the large effective electric field of the polar molecule at the Ra nucleus further enhances EDM sensitivity. Initial predictions suggest that RaF is susceptible to direct cooling with lasers due to a potentially highly diagonal Frank-Condon matrix. In order to determine the feasibility of cooling RaF for future experiments, we have prepared a setup to perform laser ablation molecular spectroscopy (LAMS) to measure for the first time the vibrational structure of RaF and determine the Frank-Condon factors for its A-X transition near 700 nm. This work is supported by the U.S. DOE, Office of Science, Office of Nuclear Physics, under contract DE-AC02-06CH11357.

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