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Experimental study of photoionization of ultralong-range Rydberg molecules in 1064nm dipole trap[1] JIN YANG, JAMES SHAFFER, University of Oklahoma — Rydberg molecules have been an active and attractive research area for over a decade. This is not only because Rydberg molecules have exaggerated properties, such as giant size ˜100nm and permanent dipole moments ˜kdebye, but also because they are good candidates to explore many-body physics. Properties of Rydberg molecules have been obtained using spectroscopy in an ultracold environment. However, up to now there is little reported on the decay processes of Rydberg molecules. What we know is, when photoionized, both atomic ions and molecular ions can be generated. Here we report our recent experimental research on the photoionization process of Cs Rydberg molecules loaded in a crossed 1064nm dipole trap. We found the dominant product of photoionization of Cs Rydberg molecules is Cs_2^+ molecular ions but they can be photodissociated into Cs^+ atomic ions by the trapping laser. The rates of photoionization provide insight into the molecular decay mechanisms.

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