

Abstract Submitted  
for the DAMOP18 Meeting of  
The American Physical Society

**Long range Rydberg molecules interacting with a dense random gas** JAN MICHAEL ROST, Max Planck Institute for the Physics of Complex Systems, PERTTU LUUKKO, Laboratory of Physics, Tampere University of Technology, Tampere, Finland — Trilobites are exotic giant dimers with enormous dipole moments. They consist of a Rydberg atom and a distant ground-state atom bound together by short-range electron-neutral attraction. Highly polar, polyatomic trilobite states unexpectedly persist and thrive in a dense ultracold gas of randomly positioned atoms [1]. This is caused by perturbation-induced quantum scarring and the localization of electron density on randomly occurring atom clusters. At certain densities these states also mix with an s-state, overcoming selection rules that hinder the photoassociation of ordinary trilobites.

[1] P.J.J. Luukko and J.M. Rost, PRL 119, 203001 (2017).

Jan Michael Rost  
Max Planck Institute for the Physics of Complex Systems

Date submitted: 25 Jan 2018

Electronic form version 1.4