

Rydberg atom mediated polar molecule interactions

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Manipulating Rydberg interactions in ultracold ensemble is currently in vogue due to the long-range nature of forces and large dipole moments. Interactions between ultracold Rydberg and ground state atoms lead for formation of exotic classes of Rydberg molecules. A particular class of such homonuclear molecules was recently observed to exhibit significant permanent electric dipole moments. Rydberg atom mediated coupling with polar molecules leads to formation of ultralong range polyatomic molecules, which can be employed to dramatically enhance the range of controlled interaction between polar molecules, to coherently control molecular orientation, and to individually address polar molecules in optical lattices.

Biography

H. R. Sadeghpour is the director of the Institute for Theoretical Atomic Molecular and Optical Physics (ITAMP) at the Harvard-Smithsonian Center for Astrophysics in Cambridge, MA. ITAMP is the premier institute of theoretical AMO physics in the US. Sadeghpour is also a senior scientist at the Smithsonian Astrophysical Observatory and a senior research fellow at the Harvard College Observatory.

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