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Multi-scatterer potentials: application to Rydberg trimers and tetramers[1] ROBIN COTE, JOVICA STANOJEVIC, Department of Physics, University of Connecticut, Storrs — We present a Green's function method to calculate the eigenenergies of a Rydberg atom interacting with several ground-state atoms (scatterers). This method yields numerically exact Rydberg bound-state energies (i.e molecular potentials) if the range of electron-scatterer interactions can be set to zero. This is essentially a multi-scattering problem, and to solve it, one has to find all scattering amplitudes associated with the scattering of the Rydberg electron from all scatterers. These scattering amplitudes are not independent and their linear relationships are expressed by a matrix $\hat{A}$. The bound-state energies (i.e molecular potentials) correspond to the zeros of $\det(\hat{A})$. We apply this method to the case of two and three scatterers, and explore the properties of Rydberg trimers and tetramers.

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Jovica Stanojevic
University of Connecticut, Storrs

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