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Recurrences in rotational dynamics and superfluid response in doped He-HCCCN and He-N_2O clusters NIKOLAY BLINOV, PIERRE-NICHOLAS ROY, WOLFGANG JÄGER, Department of Chemistry, University of Alberta — Recent experiments on He-N_2O complexes revealed the oscillatory behavior of the rotational constant in the range of cluster sizes corresponding to the completion of the first solvation shell. We use the path-integral Monte Carlo approach to show that this phenomenon can be associated with a non-monotonic size evolution of the non-classical rotational inertia and superfluidity, the origin of which can be traced back to combined solvent layering and bosonic exchange effects. Using the dopant molecule as an experimental microscopic probe of superfluidity, we show that in small doped helium clusters superfluidity builds up in stages correlated with the filling and completion of solvation shells.

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