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Asymtotics of clusters of eigenvalues for perturbations of the hydrogen atom Hamiltonian

We present in this talk a limiting eigenvalue distribution theorem for the Schrödinger operator of the hydrogen atom (with the Planck parameter $\hbar$ included) plus ϵ times a bounded continuous function Q. By considering suitable dilation operators, we prove that taking $\epsilon = O(\hbar^2)$ we obtain well defined clusters of eigenvalues around the energy $E = -1/2$ whose limiting distribution involves the Radon transform of the function Q along the classical orbits of the Kepler problem with energy $E = -1/2$ with respect to an integration over the space of geodesics of the 3-sphere S^3. The idea of the proof involves a well known unitary transformation from the Hilbert space generated by the bound states of the hydrogen atom onto $L^2(S^3)$ and coherent states on the sphere S^3. We will comment on the generalization of the theorem above to the n-dimensional case and when Q is a pseudodifferential operator of order zero.