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TITULO: Bound states of a quantum many-body system and number theory

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ABSTRACT

In this talk we shall discuss about localized bound states and clusters of bound particles for the case of an exactly solvable derivative delta-function Bose gas in one dimension. It has been found that bound states and clusters of bound particles can be constructed for this Bose gas for some special values of the coupling constant, by taking the quasi-momenta associated with the Bethe eigenfunctions to be equidistant points on a circle in the complex momentum plane. We shall discuss about an interesting connection between these special values of the coupling constant and some fractions belonging to the Farey sequences in number theory. This connection leads to a classification of such clusters of bound particles and allows us to study various properties of these clusters like their size and their stability under the variation of the coupling constant.