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Bethe Colloquium: Cluster integrable systems and the tame symbol

Thursday, 23 March 2023 16:15 (1 hour)

Cluster integrable systems discovered by Goncharov and Kenyon is an approach to a large class of integrable systems starting with the Poncelet porism discovered 200 years ago to modern spinning tops, Toda lattices and in its quantum versions, which are not yet very well understood, lattice models, Hofstadter's butterfly and many others.

The cluster approach to those systems interprets their phase spaces either as the space of configurations of flags in an infinite dimensional space or as the space of pairs (spectral curve, line bundle on it). This dual approach allows to study the systems in detail and of course to find their classical solutions.

However, the quantization of these systems does not go as smoothly as its classical part. We will suggest a quasi-classical approach to those systems using a tool borrowed from number theory namely the tame symbol. In its simplest incarnation, tame symbol is a multiplicative analogue of the residue. We use it to formulate the Bohr-Sommerfeld condition on the Lagrangian subvarieties for the integrable systems, thus giving the quasi-classical spectrum with the wave function expressed in terms of the dilogarithm.

If time permits we will speak about some elementary applications of the tame symbol.

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