

Titles and Abstracts of the talks

Giordano Cotti “Monodromy local moduli of semisimple coalescent Frobenius structures”

Based on a series of joint papers with B. Dubrovin and D. Guzzetti. In occasion of the 1998 ICM in Berlin, B. Dubrovin conjectured an intriguing connection between the enumerative geometry of a Fano manifold X with algebro-geometric properties of exceptional collections in the derived category $D^b(X)$. Under the assumption of semisimplicity of the quantum cohomology of X , the conjecture prescribes an explicit form for local invariants of $QH^*(X)$, the so-called “monodromy data”, in terms of Gram matrices and characteristic classes of objects of exceptional collections. Frobenius manifolds appearing in the study of the conjectural relations mentioned above typically show a coalescence phenomenon at points where the Frobenius algebra is semisimple, but the operator of multiplication by the Euler vector field has not simple spectrum. On the one hand, the definition of monodromy data is based on the analytic theory of isomonodromy deformations, which a priori cannot be applied at coalescence semisimple points of $QH^*(X)$. On the other hand, it turns out that the Frobenius structure may be known only at coalescence points, which are thus the only locus where the monodromy data can actually be computed. This is the case of the small quantum cohomology of complex Grassmannians, for which the occurrence and frequency of the coalescence phenomenon is surprisingly subordinate to the distribution of prime numbers. In this talk I will firstly show how under minimal conditions the classical theory of M. Jimbo, T. Miwa and K. Ueno (1981) can be extended to describe isomonodromy deformations at a coalescing irregular singularity; I will also show how to locally describe the Frobenius structure near coalescing semisimple points, and finally, what is the “mirror counterpart” of our description in terms of exceptional collections in the derived category.

Vassily Gorbounov “Quantum integrable systems and networks”

We will show that a particular type of 5 vertex model is equivalent to networks on graphs on a plane or cylinder. It leads to very special properties of its partition functions, namely they carry a cluster algebra structure.

Iain Gordon TBA

Paolo Lorenzoni “Bi-Flat F-manifolds, complex reflection groups and integrable systems of conservation laws”

We show that bi-flat F-manifolds can be interpreted as natural geometrical structures encoding the almost duality for Frobenius manifolds without metric. Using this framework, we extend Dubrovin's duality between orbit spaces of Coxeter groups and Veselov's v -systems, to the orbit spaces of exceptional well-generated complex reflection groups of rank 2 and 3. We finally discuss some applications to integrable systems of conservation laws. The talk is based on joint works with A. Arsie.

Marta Mazzocco TBA