Bologna Workshop on:
CFT AND INTEGRABLE MODELS
and their applications from gauge/gravity dualities to statistical mechanics and quantum information

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Graded S-matrices, fractional-spin charges and twisted TBAs

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Integrable quantum field theories with $\mathbb{Z}_n$ symmetry arise from decomposing two-body scattering amplitudes into cyclically shifted components, leading to graded S-matrices that organize asymptotic states into internal $\mathbb{Z}_n$ sectors. This framework preserves a generalized notion of braiding unitarity and crossing symmetry, and features an infinite tower of conserved charges with fractional spin, setting the stage for fractional Smirnov-Zamolodchikov deformations. Graded TBA equations capture the finite-volume spectrum across twisted sectors: in the ultraviolet limit, preliminary analytical and numerical results are consistent with the spectrum of a cyclic orbifold $\mathrm{CFT}^{\otimes n}/\mathbb{Z}_n$. A structural connection with the ODE/IM correspondence also emerges.

Based on ongoing work with N. Brizio, N. Primi and R. Tateo.

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