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Ομιλία Γενικού Σεμιναρίου

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***Τίτλος*:** «Rigorous leading order asymptotic solutions of the semiclassical focusing NLS equation»

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***Τόπος*:** Αίθουσα **Γ32**, Τμήμα Μαθηματικών

Abstract:

Solving an integrable nonlinear differential equation reduces to solving the matrix Riemann-Hilbert problem (RHP) that arises from the invese scattering procedure. Typically, this means finding a matrix m(z) that is analytic in the closed complex plane except on a given oriented contour on which m(z) has a jump discontinuity: the limit value of m(z) left of the contour equals its limit value on the right multiplied by a given "jump matrix" V(z). The space-time variables appear as parameters in the jump matrix; the complex variable z is the spectral variable of the linear differential operator that effects the linearization of the nonlinear system through the Lax pair associated with the system. It is the nonlinear analogue to the Fourier variable of linear PDE theory. We derive an explicit formula for the leading asymptotic (oscillatory) solution of the semiclassical focusing nonlinear Schroedinger equation for a class of initial data and prove an error estimate. We extend the analysis when time is large, the asymptotic formula is then expressed in terms of elementary functions. In this talk, we outline the notions of integrability and Lax pair and how the RHP arises naturally. We then give a broad description of the steepest descent procedure; that is, we outline how it reduces the original RHP to an explicitly solvable model RHP through jump matrix factorizations and contour deformations of the original problem. Time permitting, we will briefly describe the error estimate.