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Igor Rumanov* (igor.rumanov@colorado.edu), Dept. of Applied Mathematics, 526 UCB, University of Colorado Boulder, Boulder, CO 80309. *Classical integrability, quantum integrability and Dyson beta ensembles of random matrices*. Preliminary report.

Probability distributions of eigenvalues of random matrix ensembles (RME) with symmetries are known to satisfy various integrable PDEs. Studying Dyson beta RME leads to new interesting relations between certain classical and quantum integrable systems. Some of their eigenvalue probability distributions satisfy Fokker-Planck (FP) equations with canonically quantized Painleve (a.k.a. (confluent) Heun) Hamiltonians. I show that any solution of a general FP type equation in one space (and one time) dimension can be considered as an eigenvector component of a matrix Lax pair. The example of largest eigenvalue distribution of large matrix size limit of a Wishart beta ensemble corresponds to quantum Painleve II in the above sense. A description of this distribution in terms of classical nonlinear integrable PDEs is made explicit and, for even values of parameter beta, is given in terms of system of ODEs involving beta/2 Calogero interacting particles in an additional time-dependent external potential. (Received September 17, 2013)