1096-00-1510 **Alexander Its*** (`itsa@math.iupui.edu`), Department of Mathematics, Indiana university-Purdue University, 402 N. Blackford, LD 270, Indianapolis, IN 46202. *On the higher universality classes in the random matrix model.*

We will discuss the asymptotic analysis of the Painlevé - type Fredholm determinants describing (a) the edge eigenvalue behavior in unitary random matrix models with critical edge points, and (b) the critical behavior of the eigenvalue gap probabilities in the same model near a quadratic zero of the limiting mean eigenvalue density. In the first case, the determinant is associated with the Painlevé I hierarchy, and it represents the higher order analog of the beta=2 Tracy-Widom distribution. In the second case, the kernel is given in terms of the second Painlevé equation, and it represents the higher order analog of the classical sine-kernel determinant. In the both cases, we will present the large gap asymptotic expansion, including the constant terms. The talk is based on the joint works with T. Bothner, T. Claeys, and I. Krasovsky. (Received September 16, 2013)