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Regular Session:

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Title: *Discrete Painlevé Equations with Constraints: Their Geometry and Symmetry*

Abstract: Discrete Painlevé equations are discrete dynamical systems on families of Sakai surfaces that admit actions of extended affine Weyl groups. The Painlevé dynamics is generated by the actions of translations or quasi-translations. The Sakai classification of discrete Painlevé equations is complete on the level of surfaces, as well as on the level of the symmetry groups that generate the dynamics in the generic case. However, there are non-generic cases, i.e. discrete Painlevé equations with constraints, in which the true symmetry group is a proper subgroup of the generic one for its type. We consider a class of examples where constraints correspond to, algebraically, setwise stabilizers of some subset of simple roots, and geometrically, to existence of configurations of nodal curves. Such stabilizers can be described explicitly in terms of generators and relations following the techniques developed by B. Brink and R. Howlett. In this way we can obtain discrete Painlevé equations with non-simply laced affine Weyl symmetry groups, as we illustrate by considering some examples on the $\left(A_0^{(1)}\right)^{**}$ Sakai surface family with the $W\left(E_8^{(1)}\right)$ generic symmetry group.