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Michael Hartglass* (michael.hartglass@ucr.edu), University of California, Riverside, 900 University Ave., Surge hall 233, Riverside, CA 92521. *A free graph algebra and atomless loops.*

I will investigate a canonical free product (C^* or von Neumann) algebra associated to a weighted undirected graph, which was initially considered by Guionnet, Jones, and Shlyakhtenko. For the von Neumann algebra, the condition for factoriality will be described explicitly, as will the conditions for simplicity and unique trace for the C^* -algebra. Along the lines of recent work by Shlyakhtenko and Skoufranis, as well as Mai, Speicher, and Weber, I will show that certain self-adjoint polynomials in the generators of this algebra have no atoms in their spectral measure. Applications to random matrix theory and planar algebras will be discussed. (Received August 10, 2015)