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Kevin M Mugo* (kevin.mugo@gmail.com), W. Lafayette, IN 47906. *Mod 4 Representations Arising From Elliptic Curves.*

Given a continuous, surjective mod 4 representation $\rho : G_K \longrightarrow GL_2(\mathbb{Z}/4\mathbb{Z})$, we show that ρ arises from the Galois action on the 4-torsion of some elliptic curve if the fixed field of ρ contains a quartic extension, $K(\alpha)/K$, where α is the root of a polynomial of the form $u^4 + Au + B$ and when the normal closure M of $K(\alpha)$ is octahedral. We characterize these *principal*, quartic extensions as K -rational points on a certain variety and relate this property to the cohomology group $H^2(G_{M/K}, \mathbb{Z}/2\mathbb{Z})$. (Received September 23, 2015)