1139-11-244 **Brandon Alberts*** (blalberts@math.wisc.edu). *Certain Unramified Metabelian Extensions Using Lemmermeyer Factorizations.*

We study solutions to the Brauer embedding problem with restricted ramification. More specifically, suppose G and A are finite abelian groups, E is a central extension of G by A, and $f : \mathrm{Gal}(\overline{\mathbb{Q}}/\mathbb{Q}) \to G$ is a continuous homomorphism. We determine conditions on the discriminant of f that are equivalent to the existence of an unramified lift $\widetilde{f} : \mathrm{Gal}(\overline{\mathbb{Q}}/\mathbb{Q}) \to E$ of f.

As a consquence, we use conditions on the discriminant of an abelian extension $K/\mathbb{Q}$ to classify unramified extensions L/K normal over $\mathbb{Q}$ where the (nontrivial) commutator subgroup of $\mathrm{Gal}(L/\mathbb{Q})$ is contained in its center. This generalizes a result due to Lemmermeyer stating that the quadratic field of discriminant d, $\mathbb{Q}(\sqrt{d})$, has an unramified extension $M/\mathbb{Q}(\sqrt{d})$ normal over $\mathbb{Q}$ with $\mathrm{Gal}(M/\mathbb{Q}(\sqrt{d})) = H_8$ (the quaternion group) if and only if the discriminant factors $d = d_1d_2d_3$ into a product of three coprime discriminants, at most one of which is negative, satisfying

$$\left(\frac{d_i d_j}{p_k}\right) = 1$$

for each choice of $\{i, j, k\} = \{1, 2, 3\}$ and prime $p_k \mid d_k$. (Received February 12, 2018)