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**Ivan Booth\*** (ibooth@mun.ca), Dept of Math and Stats, Memorial University, St. John's, NL A1C3G1, Canada. *Probing black hole physics with Melvin-Kerr-Newman spacetimes.*

We examine several aspects of black hole physics using the Melvin-Kerr-Newman (MKN) family of spacetimes. Roughly speaking these are black holes immersed in a background magnetic field and unlike the standard Kerr-Newman (KN) family they are not asymptotically flat. Among other properties we see that their angular momentum and charge are bounded by horizon area in exactly the same way as KN and also that they obey the uniqueness theorems for extremal horizons: these properties are in accord with standard theorems but are seen to be satisfied in interesting and non-trivial ways. Horizon geometries are compared to the corresponding KN horizons. We examine how the laws of isolated horizon mechanics apply to the MKN family of solutions and compare that with a recent study by Gibbons, Pang and Pope. Finally we examine possible physical process interpretations of the mechanics. (Received August 15, 2014)