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Modeling of an aluminum wall-confined plasma created by MG magnetic fields RICHARD SIEMON, IRVIN LINDEMUTH, Univ. of Nevada, Reno — Experiments at UNR demonstrate that interesting fully ionized aluminum plasma (T=1-30 eV, n $\sim 10^{18}$ cm^{-3}, Z $\sim$ 3) can be created on the surface of mm-size aluminum rods by MA pulses of current. The transport properties of such plasma and nearby wall material at higher density and lower temperature are not well established, but numerical modeling using SESAME tables or Russian material model gives surprisingly good agreement with experimental observations. During the experimental time of current rise, the observed plasma temperature typically increases from 1-eV to 15 eV or more. In order for that to happen the plasma must be sufficiently dense and in a layer sufficiently thick for Ohmic heating to be larger than conduction cooling. That requirement is equivalent to saying that the electron omega-tau must be less than a small number that depends weakly upon plasma Z. This demonstration that a fully ionized plasma can be held by magnetic pressure against a solid surface in what is known as a "wall confined" geometry supports one of the basic assumptions often made in the context of magneto-inertial fusion.

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