The very hot periodic table

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All chemical elements are born naked and do not bind electrons until the temperature drops sufficiently. Most of the baryonic matter remains highly charged since the re-ionization era, be it in the cores of stars, astrophysical shocks, accretion disks, or the intra-cluster and intergalactic media. Thus, the study of highly charged ions in the laboratory is essential for astrophysical diagnostics. We also prepare such very interesting quantum systems with a controllable number of bound electrons for fundamental electronic structure studies, novel applications for optical and extreme-ultraviolet clocks, and the search for extremely weak imprints of hypothetical fifth forces on the electronic structure.