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Dielectronic recombination of W^20+ (4d^10 4f^8): addressing the half-open f-shell

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A recent measurement of the dielectronic recombination (DR) of W^20+ [Schippers et al Phys. Rev. A83, 012711 (2011)] found an exceptionally large contribution from near threshold resonances (<1eV). This still affected the Maxwellian rate coefficient at much higher temperatures. The experimental result was found to be a factor 4 or more than that currently in use in the 100-300eV range which is of relevance for modeling magnetic fusion plasmas. We have carried-out DR calculations with AUTOSTRUCTURE which include all significant single electron promotions. Our intermediate coupling (IC) results are more than a factor of 4 larger than our LS-coupling ones at 1eV but still lie a factor 3 below experiment here. If we assume complete (chaotic) mixing of near-threshold autoionizing states then our results come into agreement (to within 20%) with experiment below about 2eV. Our total IC Maxwellian rate coefficients are 50-30% smaller than those based-on experiment over 100-300eV.

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