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Effect of giant charge-transfer resonance $\sigma_{CT} \sim 10^9$ barn on operation of magnetic fusion reactor below "critical energy." TIMOTHY HESTER, BOGDAN MAGLICH, DAN SCOTT, ALEXANDER VAUCHER, California Science Engineering Corp. — Charge transfer (CT) reactivity was assumed to be negligible compared to ionization (IO) before Belfast measurements[1–3] revealed the opposite: CT predominance over IO, $\sigma_{CT} \approx 10^9$b,$\sigma_{\rm CT}/\sigma_{\rm IO} \approx$ U ≈ 100, below critical 'atomic unit of velocity', $v_o = 2.2\times10^8 cms^{-1}$, which is orbital velocity of e in H atom. Near v$_o$, $U = 1$, i.e. $\sigma_{CT} \sim \sigma_{IO}$. Critical ion energy is $T_0\,(\rm lab) = k\,25\,M$ [KeV] $=$ $200\,\rm KeV\,for\,[ERR: md: MbegChr = 0x2329, MendChr = 0x232A, nParams = 1] =$ $\rm ion\,mass\,[amu] = 4\,for\,DT\,mix; k = 2$. "Burnout" pumping that requires $U \ll 1$ is inoperable in the $U \gg 1$ regime whereas CT continually acts like compressor increasing operating vacuum pressure during neutral beam discharge to 10^{-3} Torr/0.3 s; this, in turn, sets upper limits to ion life-time against neutralization to $\bar{\tau} = 10^{-6}$ s. $\bar{\tau}$ is 10^5 times shorter than thermalization time constant; hence plasma cannot be created. Lawson[4] was unaware of CT resonance; his "critical temperature" (30 KeV for DT) should be replaced with T_0. 1. Gilbody, Physica Scripta 23, 143 (1981); 2. Gilbody, AIP 360.19 (1996); 3. Post, Pyle, Atomic Molec. Phys. Contr. Fusion p. 477, Jochain (Ed.) Plenum Press(1983); 4. Lawson, Proc. Phys. Soc. B70, 6 (1957).

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