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John D'Auria, the relativistic chemistry of francium, and MeV-mass neutrinos

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TRIUMF's neutral atom trap (TRINAT) was started as a good match for surface-ionized alkali elements produced at TISOL (TEST/TRIUMF Isotope Separator On-line).
TRINAT had two main goals– beta-neutrino correlations, and the chemistry of francium championed by John D'Auria.
Relativity makes francium's properties harder to extrapolate from the lighter alkali elements; e.g., the ionization potential is higher than cesium's due to a more deeply bound S ground-state orbital, while production of ultracold molecular dimers by photoassociation is predicted to be stymied.
TRINAT failed in its first attempt to trap beta-decaying potassium isotopes, but we fixed a ten linewidth error in our estimated atomic resonance location and succeeded two weeks later, largely because TISOL had admirable flexibility.
TRINAT also failed to trap 226Fr in 1996, and francium was not trapped at TRIUMF for another fifteen years.
Diverted personnel searched for MeV-mass neutrinos instead [M. Trinczek et al. PRL 2001], prividing a cosmology tie-in to the symposium title.

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