Ab initio calculations of $^{10}\text{C} \rightarrow ^{10}\text{B}$ super-allowed Fermi transition$^1$ MICHAEL GENNARI, PETR NAVRATIL, TRIUMF — Cabibbo-Kobayashi-Maskawa (CKM) matrix unitarity is one of the most sensitive probes for beyond standard model (BSM) physics. Extraction of the largest contributor to unitarity, the $V_{ud}$ matrix element, from super-allowed $0^+ \rightarrow 0^+$ Fermi beta decay transitions requires theoretical calculation of the isospin symmetry breaking correction $\delta C$. We apply the No-Core Shell Model with Continuum (NCSMC) $^1$, a method for describing both bound and unbound states in light nuclei in a unified way, to investigate the $^{10}\text{C} \rightarrow ^{10}\text{B}$ super-allowed Fermi transition. With chiral two- and three-nucleon interactions as the only input, we are able to calculate the isospin breaking correction $\delta C$ in a more robust way than in other approaches. We also discuss several intermediate and related results, in particular, the nuclear structure of $^{10}\text{C}$, $^{10}\text{B}$, and $^{10}\text{Be}$, as well as our plans to calculate $\delta C$ for $^{14}\text{O} \rightarrow ^{14}\text{N}$ Fermi transition. $^1$ P. Navratil, S. Quaglioni, G. Hupin, C. Romero-Redondo, A. Calci, Physica Scripta 91, 053002 (2016).

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