Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: **2561**       Type: **Oral not-in-competition (Graduate Student) / Orale non-compétitive (Étudiant(e) du 2e ou 3e cycle)**

# An Improved Extraction of the Vud CKM Matrix Element

*Thursday 6 June 2019 14:15 (15 minutes)*

The CKM matrix of the Standard Model (SM) is a unitary $3 \times 3$ matrix which holds information on how strongly the various quark flavours couple to each other. Consequently, nature's adherence to the SM can be tested by the normalization condition of its rows. $|V_{ud}| = 0.97417(21)$ is a dominant term in the first row unitarity condition: $|V_{ud}|^2 + |V_{us}|^2 + |V_{ub}|^2 = 1$, and thus carries more weight than its 2 neighbours. The largest source of its uncertainty comes from a troublesome, model-dependent radiative correction: the $\gamma W$ box. I outline a new way to calculate this Feynman diagram using dispersion relations, which lead to a more realistic value of $V_{ud}$ and its uncertainty estimate.

**Author:** Mr SHIELLS, Kyle (University of Manitoba)

**Presenter:** Mr SHIELLS, Kyle (University of Manitoba)

**Session Classification:** R2-4 Testing Fundamental Symmetries II (DTP/PPD/DNP) | Tests de symétries fondamentales II (DPT/PPD/DPN)

**Track Classification:** Theoretical Physics / Physique théorique (DTP-DPT)