Contribution ID: **668** Type: **Oral (Student, In Competition) / Orale (Étudiant(e), inscrit à la compétition)**

Analysis of Quantum Defects in high energy Helium P states

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Quantum defects are useful in interpreting high energy atomic states in terms of simple Hydrogenic energy levels. We will find the energy levels for 1snp singlet and triplet P state Helium from $n = 2$ to $n = 12$ with some of the most accurate helium atom calculations to date using the exact non-relativistic Hamiltonian with wave functions expanded in a basis set of Hylleraas coordinates. The results will be used to determine accurate values for the coefficients in the quantum defect expansion: $\delta = \delta_0 + \delta_2/n^{*2} + \delta_4/n^{*4} + \cdots$, where $n^* = n - \delta$. We will also test the usual assumption that only the even powers of $1/n^*$ need be included [1]. In addition, we will study the effectiveness of a unitary transformation in reducing the numerical linear dependence of the basis set for large basis sets.

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