TETRANUC COLLABORATION

January 2006

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Recherche de noyaux tétraèdriques

au GANIL

avec Spiral 1 et 2

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Number of participants in January 2006:
21 persons: 16 experimentalists and 5 theorists

Starting the Proposal Campagne

The LOGO (!) of the collaboration suggests our prinipal interest: Find for the first time the experimental evidence for the tetrahedral symmetry in subatomic physics.

The collaboration is YOUNG: we plan the first meeting to discuss the proposals for GANIL in the beginning of February.

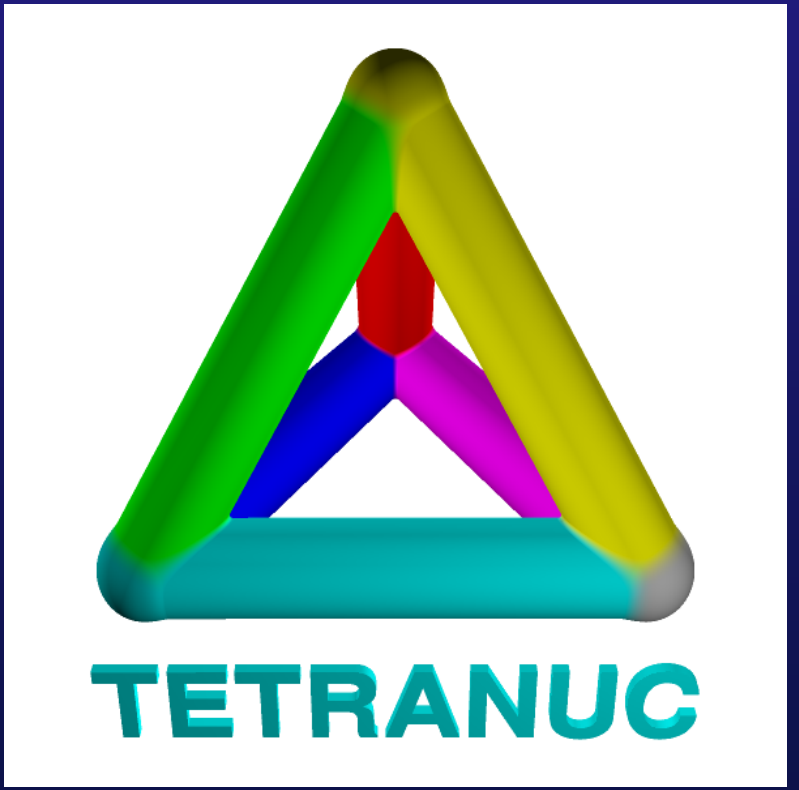

Figure 1: Logo of TETRANUC by Noel DUBRAY

Tetrahedral Minima Can Be Deep

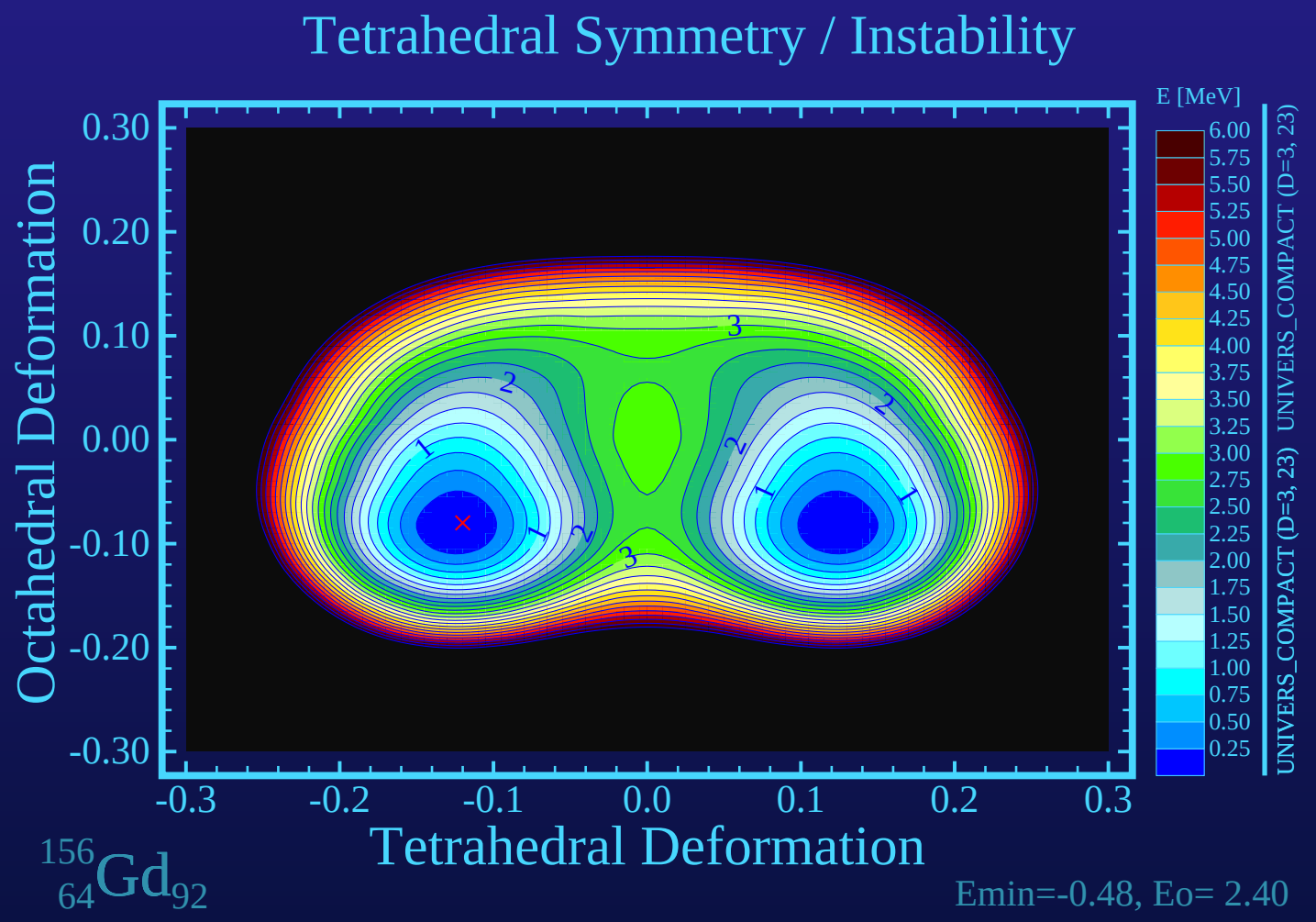

Figure 2: Example of the tetrahedral symmetry minimum in Rare Earth nuclei. Here ^{156}Gd.

Tetrahedral Minima Can Be Close to Ground-States

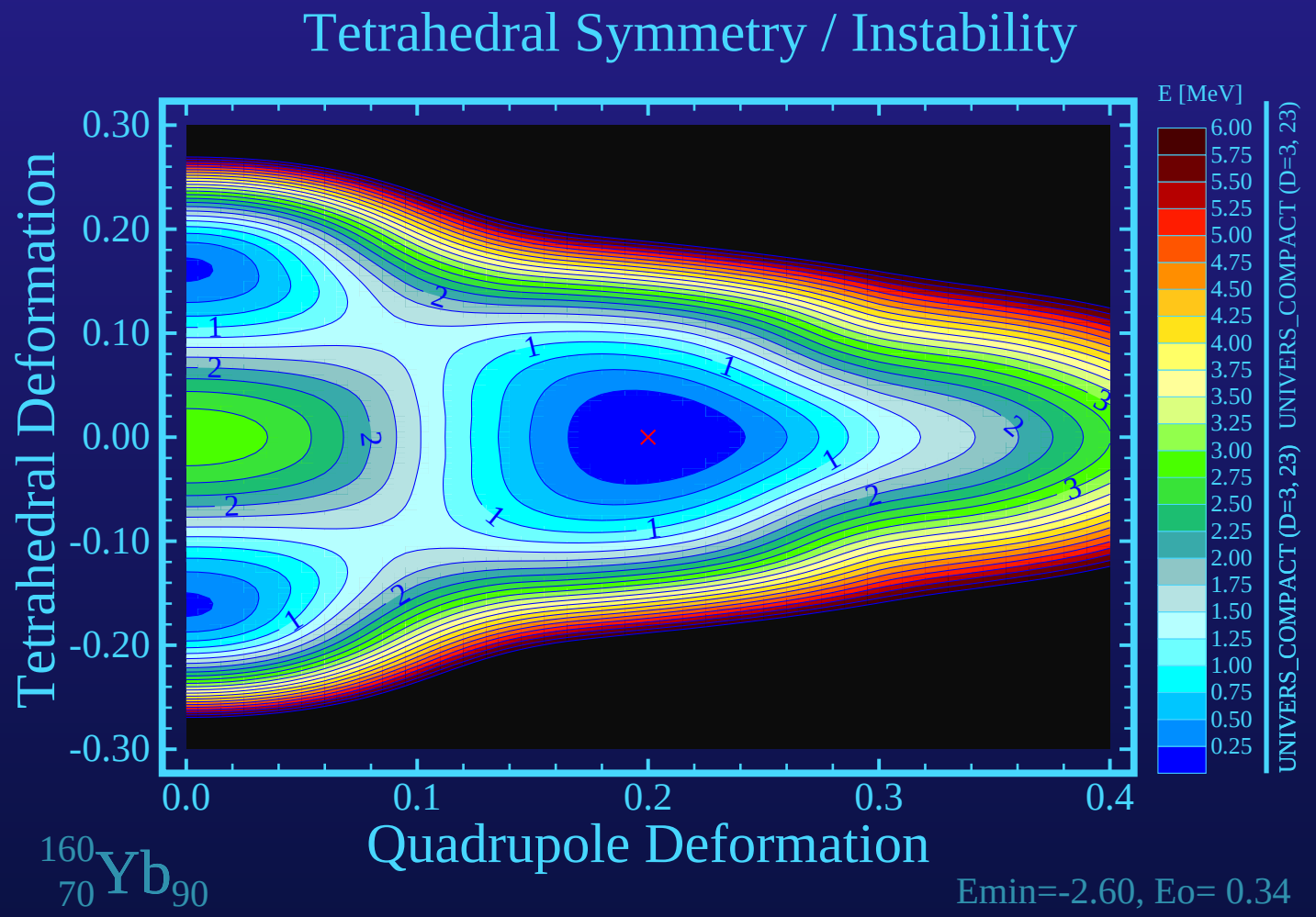

Figure 3: Tetrahedral symmetry minima are often close to the ground-states. Here ^{170}Yb.

Tetrahedral Energy Gains Can Be Huge - Here: RE

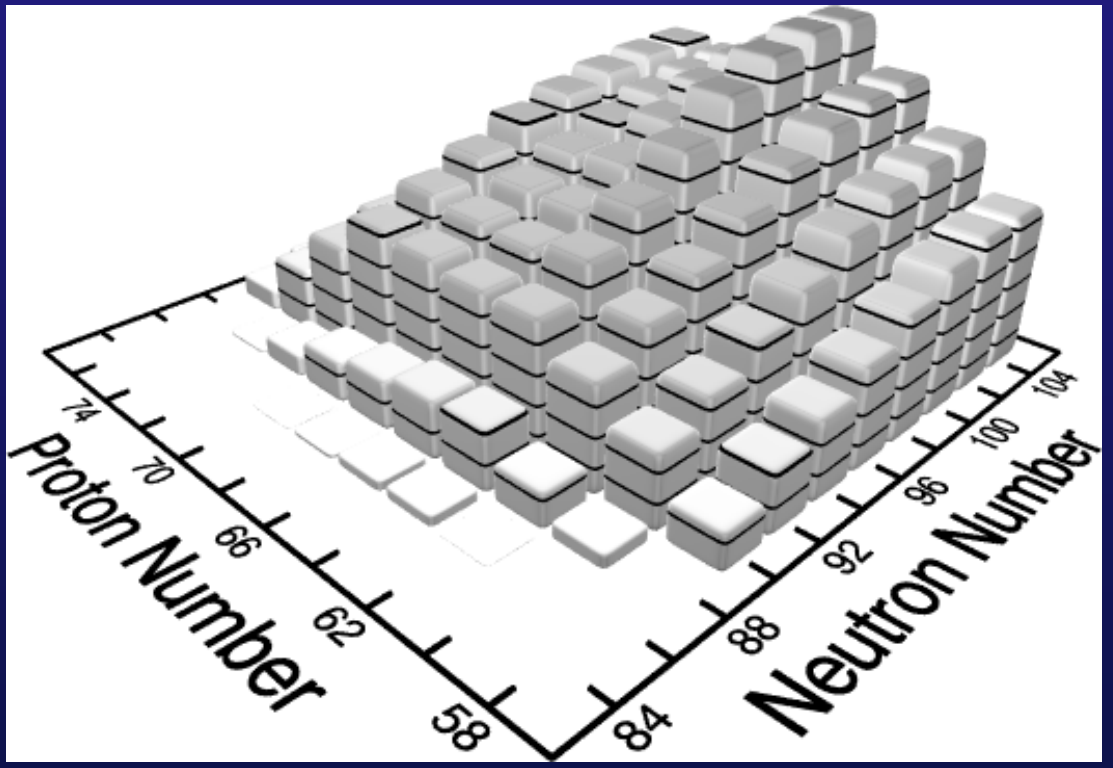

Figure 4: Tetrahedral symmetry lowers the energies with respect to the spherical shapes by huge amounts of up to 5 MeV (!) - [Box height = 0.5 MeV.]

Attention: Surrounding Barriers Can Be Capricious

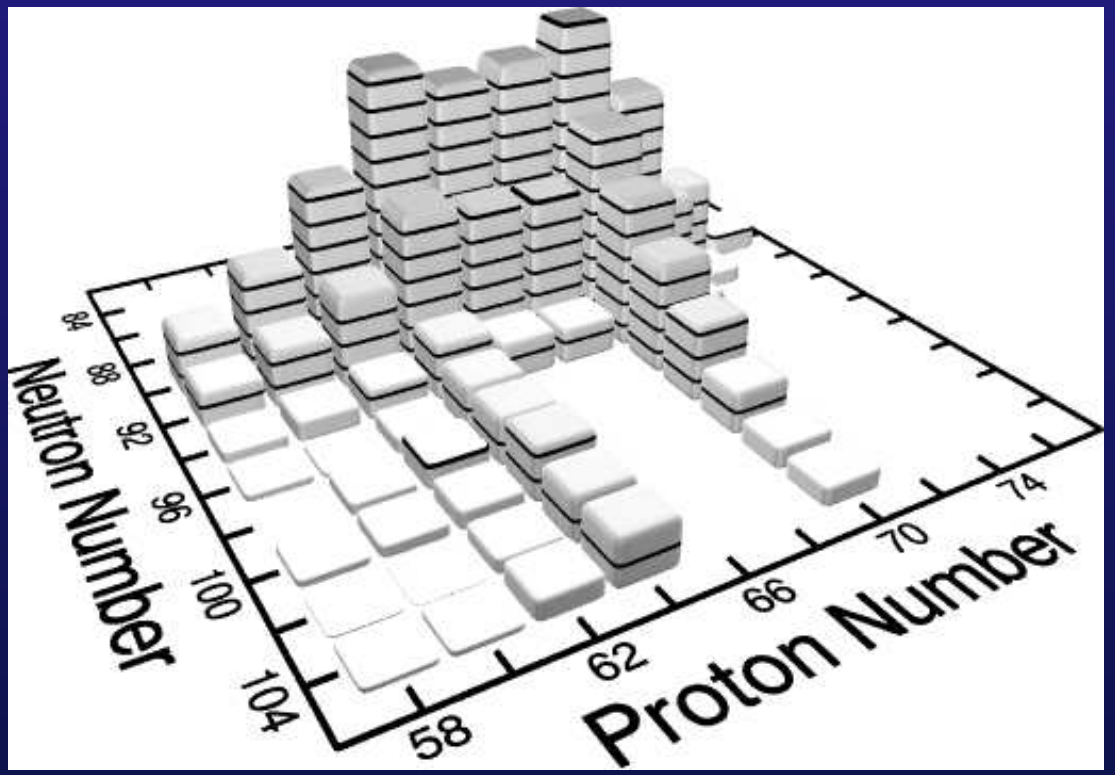

Figure 4: Here calculated barrier heights separating the tetrahedral and the ground-state minima. [Block height = 100 keV.]

Tetrahedral Minima Thoughout the Periodic Table

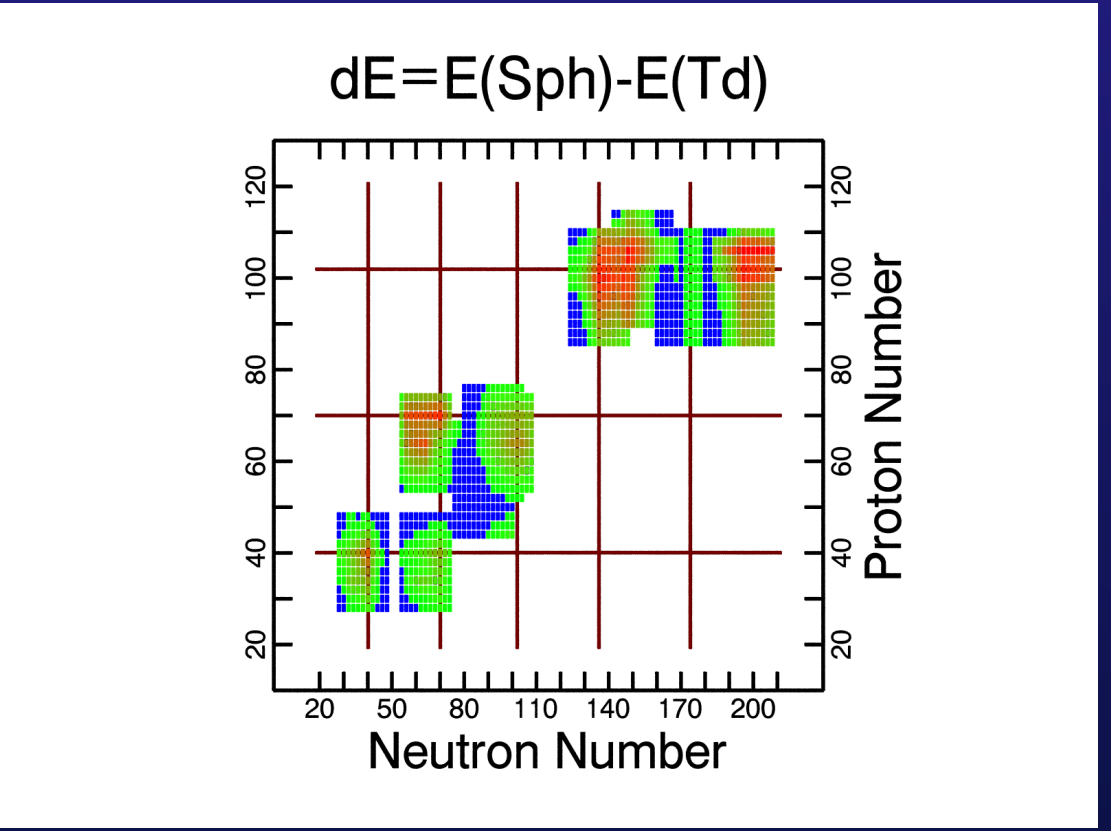

Figure 5: Tetrahedral symmetry effects are present in many (including exotic) nuclei throughout the Periodic Table. Tetrahedral-Magic Proton Numbers: $Z_0 = 40, 64, 70, 90 - 100$; Tetrahedral-Magic Neutron Numbers: $N_0 = 40, 64 - 70, 100, 136 - 144$.

Present Experimental Situation - Example: ^{156}Gd

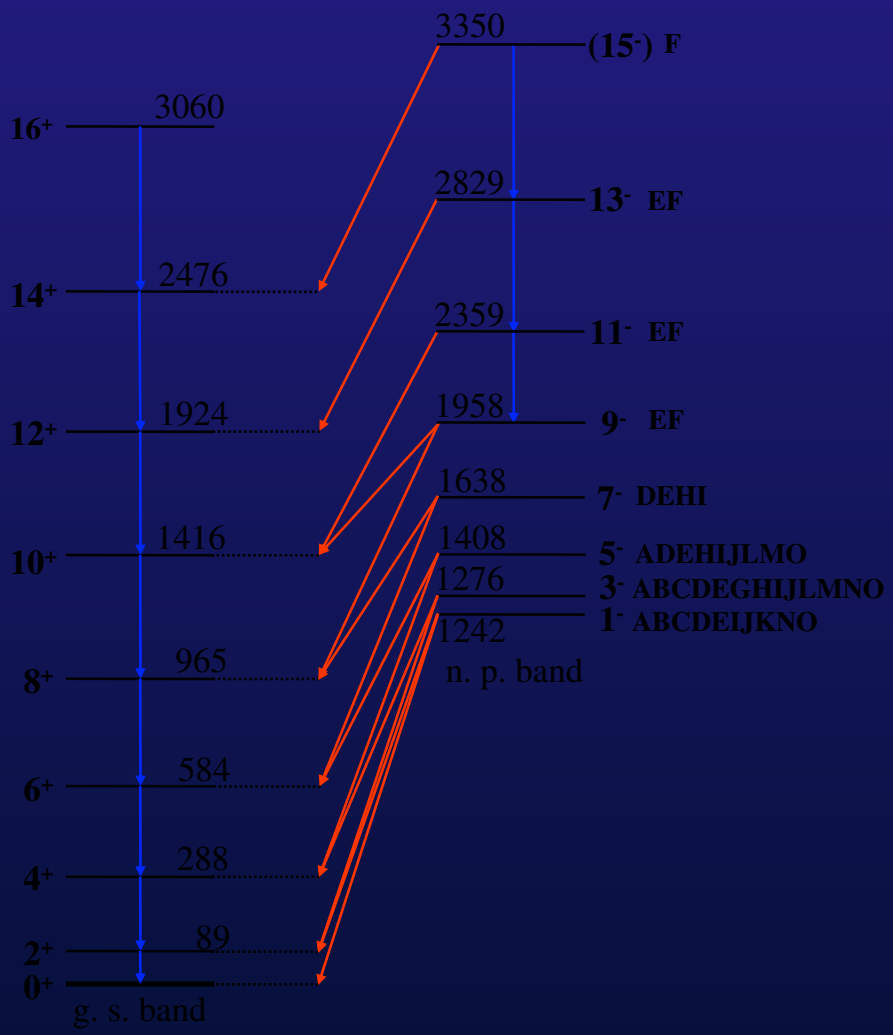

Figure 6: We have discovered in the existing literature the tetrahedral candidate-bands.

Theoretical Predictions vs. "Experiment: ^{156}Gd"

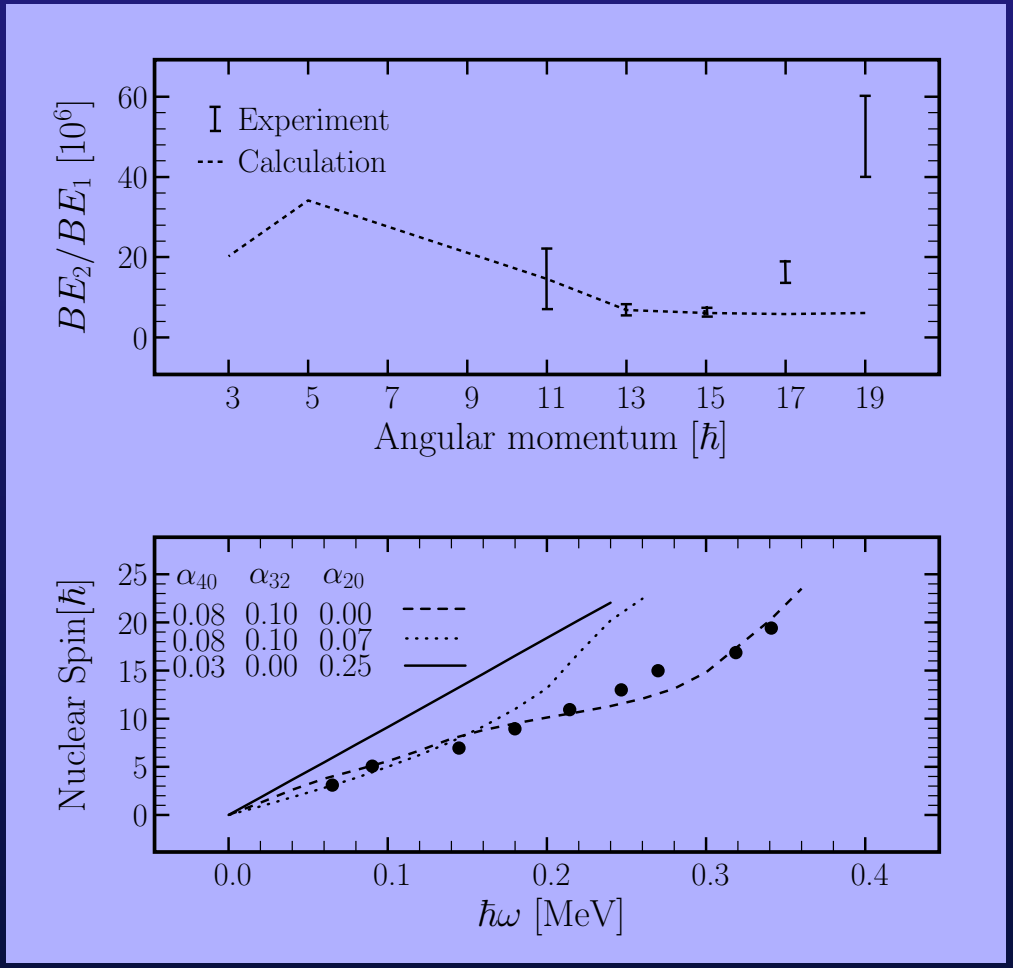

Figure 8: We have discovered in the existing literature the tetrahedral candidate-bands.