5-D Modeling of the Co-rich decagonal Al-Co-Ni Quasicrystal

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Even twenty years after the discovery of quasicrystals, not a single structure is known with the accuracy and reliability commonly expected for regular periodic structures [1]. One way leading towards understanding the structure of quasicrystals, is given by the examination of approximants.

The main interest of this work is to investigate the complete stability field of decagonal Al-Co-Ni by 5-D modeling, starting from the W-phase [2]. The latter is of particular interest, as it is the only known approximant in this system, containing the complete atomic cluster [3]. The focus will be on order, disorder and phase transformations of the decagonal Al-Co-Ni.

First 5-D modeling results of the Co-rich decagonal phase will be discussed. Via embedding the W-phase, models of the decagonal phase are rendered and phasonic modes are being applied.

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