

Modelling extremely low friction of quasicrystals

In this project, you will focus on a particular class of crystalline materials that have an unusual structure: quasicrystals. The discovery of quasicrystals was awarded the Nobel Prize in chemistry in 2011. The project is concerned with how the quasi-crystal structure will affect the friction of these surfaces, through structural superlubricity. This is a dramatic effect by which friction is reduced enormously due to structural incompatibility between two surfaces at the atomic level. You will write a simple numerical simulation to compute interactions of contacts with quasicrystalline surfaces, and whenever possible do analytical calculations to accompany them.

Recommended background

Tribology or classical mechanics. A basic programming course and an interest in modelling or programming.

Supervisor

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Research environment: <http://syonax.net/science/research.html>.

Work load

This project is intended for a combined specialization project thesis and master thesis, i.e. 45 or 60 ECTS in total.

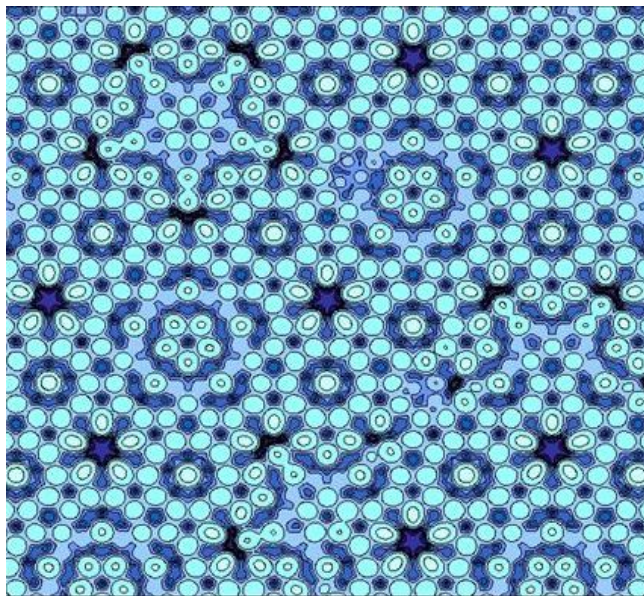


Figure 1: Example of a quasicrystal surface, atomic model of fivefold icosahedral-Al-Pd-Mn. (Picture from Wikimedia Commons.)