Spheric analogs of fullerenes

Michel DEZA, Ecole Normale Superieure, Paris

Abstract

It is a joint work with Mathieu Dutour Sikiric.

Given $R \subset \mathbb{N}$, a $(R; k)$-**sphere** is a finite connected k-regular plane graph whose only i-gonal, $i \in R$, faces. Such $(\{a, b\}; k)$-spheres with $(a, b; k) = (5, 6; 3)$ or $(4, 6; 3)$ and $(R; 4)$ correspond to carbon or boron nitride *fullerenes* and projections of alternating links, respectively.

We consider $(\{a, b\}; k)$-spheres with $1 \leq a < b = \frac{2k}{k-2}$; so, $4, 2, 2$ infinite families with $(b, k) = (6, 3), (4, 4), (3, 6)$. Their symmetry groups, parametrizing, zigzag (or central circuit) and railroad structure are presented.

Some results are generalized on $(\{a, b\}, k)$-discs and $(\{a, b\}, k)$-maps on surfaces.