CCSU
DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, September 7
2:00 – 3:00 PM
Maria Sanford, Room 101

ROTATIONALLY SYMMETRIC EMBEDDED SURFACES WITH CONSTANT MEAN CURVATURE IN THE THREE-DIMENSIONAL UNIT SPHERE

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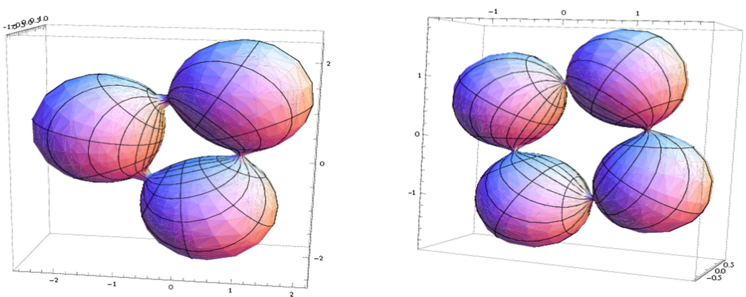
Abstract: An embedded surface is a surface without self-intersections. A torus is a surface topologically equivalent to the surface of a doughnut. The three dimensional sphere is the most basic example of a 3-D universe with no boundary and finite volume. Mathematically it can be described as the set of points in R^4 that are 1 unit away from the origin. Minimal surfaces are surfaces with mean curvature 0. They play an important role in geometric because they are the critical points of the functional area. For a long time, it has been known that the surface

$$C=\{(x_1, x_2, x_3, x_4): x_1^2+ x_2^2 = 1/2 \text{ and } x_3^2+ x_4^2 = 1/2\}$$

is topologically a torus, it is embedded, it is contained in S^3 and it is minimal in S^3. C is known as the Clifford torus. Mathematician wondered for a long time if they could find another embedded example of a minimal torus in S^3. Actually, Lawson conjectured that the Clifford torus is the only embedded example. In 2009, the speaker studied rotationally symmetric tori with constant mean curvature H in S^3 and showed the existence of a big collection of embedded examples. The following picture shows the stereographic projection of two of these tori



Recall that the stereographic projection of a surface in S^3 is a surface in the Euclidean space R^3.

In April of this year, Brendle provided a short proof of the Lawson conjecture. Using similar methods, in June of this year, Andrews and Li showed that every embedded surface in S^3 is rotationally symmetric. In this talk we will prove that the only rotationally symmetric surfaces in S^3 are those found by the speaker three years ago. As a consequence we have that the only embedded tori with constant curvature in S^3 are those discovered by the speaker.

For further information:
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