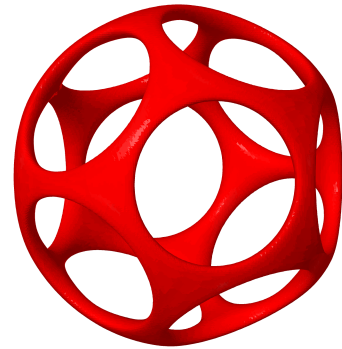


**Oberseminar Geometrie**  
Department of Mathematics  
University of Fribourg  
Seminar room, Math II (Lonza)  
**Wednesday March 1, 2017, 10:20-12:00**



MICKAËL KOURGANOFF (Grenoble)

### **Anosov geodesic flows, billiards and embedded surfaces**

Consider an ellipsoid and make one of its axes tend to zero: the ellipsoid flattens and tends to an ellipse in the plane formed by the two other axes. As Birkhoff had noticed, the geodesic flow on the ellipsoid converges to the billiard flow on the ellipse. In fact, this phenomenon is far more general: we will see that it applies to almost any surface in  $\mathbb{R}^3$  which is flattened along an axis. Moreover, if the billiard obtained at the limit is dispersing, under some mild conditions, then the geodesic flow on the surface is Anosov (then the two systems display the same type of chaotic behavior). This theorem allows us to obtain a concrete example of Anosov physical system: a linkage with 5 rods. Finally, with a new version of the theorem which applies, this time, to non-flat billiards, we obtain examples of surfaces with a small genus, with Anosov geodesic flow, isometrically embedded in the sphere  $\mathbb{S}^3$ .