Berlin Mathematics Research Center MATH+

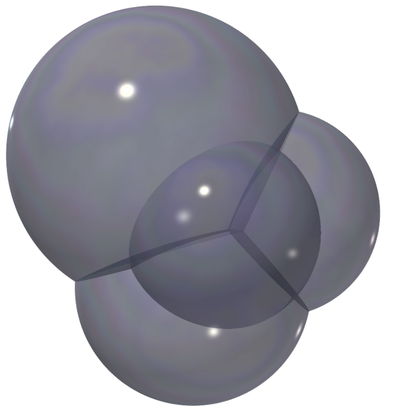
Berlin Mathematical School BMS

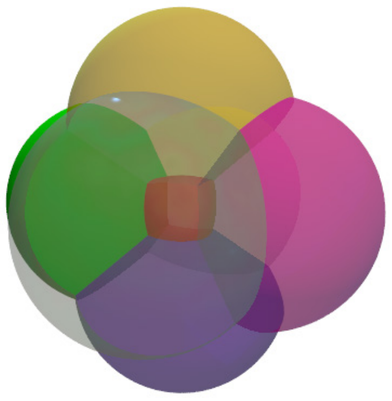
MATH+ Friday Colloquium

Friday, 26 June 2026 at 14:15

TU Berlin, Math Building, Straße des 17. Juni , Room MA001

Tea & Cookies starting at 13:30





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(Technion)

Multi-Bubble Isoperimetric Problems

The classical isoperimetric inequality in Euclidean space $\mathbf{R}^n$ states that among all sets of prescribed volume, the Euclidean ball (uniquely) minimizes surface area, explaining why a single soap bubble is always a round sphere. One may similarly consider isoperimetric problems in more general spaces, such as in the n-sphere $\mathbf{S}^n$ and in n-dimensional Gaussian space $\mathbf{G}^n$ (i.e. $\mathbf{R}^n$ endowed with the standard Gaussian measure). More generally, we consider the multi-bubble isoperimetric problem, in which one prescribes the volumes of $k \geq 2$ bubbles and minimizes their total surface area – as any mutual interface will only be counted once, the bubbles are thus incentivized to clump together. A concrete conjecture for the most efficient bubble configuration was put forth by John M. Sullivan (TU Berlin) in the 1990's. We survey recent advances in the characterization of multi-bubble isoperimetric minimizers in $\mathbf{G}^n$, $\mathbf{R}^n$ and $\mathbf{S}^n$, as well as the local stability of more general soap bubble partitions. This talk is based on joint work with Joe Neeman and Botong Xu, and will include many pictures!

Emanuel Milman is a Professor of Mathematics at the Technion – Israel Institute of Technology, specializing in geometric analysis, isoperimetric inequalities, and convex geometry. He is the recipient of numerous honors, including the Anna and Lajos Erdős Prize in Mathematics, the Yitzhak Modai Academic Chair, the Frontiers of Science Award in Mathematics, several European Research Council (ERC) grants, and was invited to speak at the upcoming International Congress of Mathematicians. Milman has held visiting positions at leading institutes such as IAS, MSRI and UT Austin, and serves on editorial boards for several journals and lecture series, including the Journal of Functional Analysis and Ars Inveniendi Analytica.