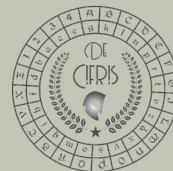




UNIVERSITÀ
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Dipartimento di
Matematica



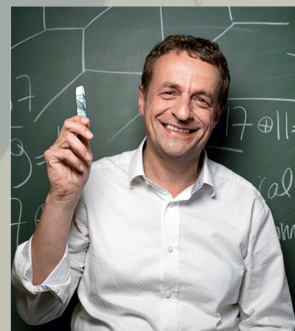
Mathematics Colloquium Day

25 October 2023 | Polo Ferrari - Povo 1

Invited Guest

Bernd Sturmfels

(MPI MiS Leipzig, Germany)



Full Program

13:30 — 14:30 | Room A208

Meeting with the students

Q&A Session: **Research and Career in Mathematics**

14:30 — 15:30 | Room A208

Mathematics Colloquium

Algebraic Varieties in Quantum Chemistry

We discuss the algebraic geometry behind coupled cluster (CC) theory of quantum many-body systems. The high-dimensional eigenvalue problems that encode the electronic Schrödinger equation are approximated by a hierarchy of polynomial systems at various levels of truncation. The exponential parametrization of the eigenstates gives rise to truncation varieties. These generalize Grassmannians in their Plücker embedding. We explain how to derive Hamiltonians, we offer a detailed study of truncation varieties and their CC degrees, and we present the state of the art in solving the CC equations. This is joint work with Fabian Faulstich and Svala Sverrisdóttir.

15:30 — 16:30 | Common Room Ground Floor Povo1

Refreshments

Background:

Painting - *Cross Ratio in an Ellipse (Poncelet-Chasles)* by Johnson, Crockett

Credit: Ruth Krauss in memory of Crockett Johnson

National Museum of American History (<https://americanhistory.si.edu/>)

Smithsonian Institution

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