

**De:** Centre de recherches mathématiques [crm@crm.umontreal.ca](mailto:crm@crm.umontreal.ca)  
**Objet:** COLLOQUE DES SCIENCES MATHÉMATIQUES DU QUÉBEC (16/02/2018, Alexander Turbiner) - Mathématiques  
**Date:** 12 février 2018 10:52  
**À:** [activites@CRM.UMontreal.CA](mailto:activites@CRM.UMontreal.CA)



\*\*\*\*\*

COLLOQUE DES SCIENCES MATHÉMATIQUES DU QUÉBEC  
<http://www.crm.umontreal.ca/Colloques/index.html>

\*\*\*\*\*

DATE :  
Le vendredi 16 février 2018 / Friday, February 16, 2018

HEURE / TIME :  
16 h / 4:00 p.m.

CONFERENCIER(S) / SPEAKER(S) :  
Alexander Turbiner (UNAM)

TITRE / TITLE :  
Quantum n-body problem: generalized Euler coordinates (from J-L Lagrange to Figure Eight by Moore and Ter-Martirosyan, then and today)

LIEU / PLACE :  
CRM, Université de Montréal, Pavillon André-Aisenstadt, salle 6254

RESUME / ABSTRACT :  
The potential of the  $n$ -body problem, both classical and quantum, depends only on the relative (mutual) distances between bodies. By generalized Euler coordinates we mean relative distances and angles. Their advantage over Jacobi coordinates is emphasized.

The NEW IDEA is to study trajectories in both classical, and eigenstates in quantum systems which depends on relative distances ALONE.

We show how this study is equivalent to the study of

(i) the motion of a particle (quantum or classical) in curved space of dimension  $n(n-1)/2$

or the study of

(ii) the Euler-Arnold (quantum or classical) -  $\mathfrak{sl}(n(n-1)/2, \mathbb{R})$  algebra top.

The curved space of (i) has a number of remarkable properties. In the 3-body case the {it de-Quantization} of quantum Hamiltonian leads to a classical Hamiltonian which solves a ~250-years old problem posed by Lagrange on 3-body planar motion.

\*\*\*\*\*

Responsables :  
Olivier Collin (UQÀM)  
Henri Darmon (Université McGill)  
Dimitris Koukoulopoulos (Université de Montréal)  
Iosif Polterovich (Université de Montréal)  
David Stephens (Université McGill)  
Hugh Thomas (UQÀM)  
Yi Yang (Université McGill)

\*\*\*\*\*

