

## ABSTRACT

### **Geometry and Physics of Invariant Theory**

Felix Klein in his Manifesto 1872, known as Erlangen program, reduced projective geometry to invariant theory of a certain representation of the geometrical structure group  $G$ .

However, soon after initial success, it became clear that a complete algebraic description of invariants is an intractable problem for all but very few representations.

A way out of this deadlock was first indicated by Hilbert who invented ingenious geometrical arguments to get an insight into structure of invariants. The approach was advanced further by Mumford who call it Geometric Invariant Theory.

In the talk I outline the basic ideas of Hilbert-Mumford theory and apply them to solutions of some longstanding problems originated both from mathematics and physics. They include relations between spectra of Riemann and Ricci curvature operators, and constraints on occupation numbers  $n_i$  of multielectron system, that go beyond the standard Pauli condition  $n_i < 1$ .