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## **Complex geometry and complex analysis on symmetric spaces**

I will discuss the role of complex geometry and complex analysis in harmonic analysis on symmetric spaces (not only complex ones). It goes back to Weyl's unitary trick which was a way to avoid complex analysis and to work with compact groups using tools of real analysis. What kind advantages will we have if we will develop complex analysis directly on complex semisimple groups?

In the case of real (semisimple) symmetric spaces we will consider the problem of the separation of series of representations, which we will interpret as a noncommutative analogue of decompositions of functions on the line as the sum of functions holomorphic at half-planes. It turns out that complex horospheres are responsible for this central problem of harmonic analysis on real symmetric spaces. It reflects a progress in a project which we initiated with Gelfand more than 40 years ago.