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Matvei Libine* (mllibine@indiana.edu) and **Igor Frenkel**. *Quaternionic Analysis, Representation Theory and Physics*.

This is a joint work with Igor Frenkel.

I will describe our new developments of quaternionic analysis using representation theory of various real forms of the conformal group as a guiding principle. These developments will lead to a solution of Gelfand-Gindikin problem. Along the way we discover striking new connections between quaternionic analysis and mathematical physics. In particular, the Maxwell equations are realized as the quaternionic counterpart of the Cauchy formula for the second order pole. We also find a representation-theoretic meaning of the polarization of vacuum and one-loop Feynman integrals.

This talk is partially based on the joint paper with Igor Frenkel, "Quaternionic analysis, representation theory and physics", *Advances in Mathematics* 218 (2008) pp 1806-1877; also available at arXiv:0711.2699 (Received September 11, 2009)