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Helgason-Fourier analysis techniques on hyperbolic spaces and sharp geometric and functional inequalities

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In this talk, we will report some recent progress on sharp geometric and functional inequalities by using the Helgason-Fourier analysis techniques on hyperbolic and symmetric spaces. These techniques allow us to establish sharp higher order Hardy-Sobolev-Maz'ya and Hardy-Adams inequalities on upper half spaces, complex Siegel domains and quaternionic and octanionic hyperbolic spaces. Some applications to PDEs will also be given.