A noncommutative approach to Fourier multipliers on groups

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Fourier multipliers are natural objects whose boundedness properties can be used as a tool to study geometric properties on groups. With that in mind, we present regularity conditions for L_p-boundedness of Fourier multipliers on the group von Neumann algebras of stratified Lie groups and high rank simple Lie groups. The conditions that we need to impose on the associated symbols are sharp canonical forms of the classical Hörmander-Mikhlin criterion in terms of Lie derivatives. Our approach is different from that to the dual problem, developed by Cowling, Müller, Ricci, Stein and many others over the last decades. We will compare both approaches and show that none yields stronger results than the other. Based on joint work with Adrián González Pérez, Javier Parcet and Eduardo Tablate.