INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
PhD-17 SHORT ABSTRACT OF THESIS

Name of the Student	:	Manali Sajjan
Roll Number	:	206123013
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Name of Thesis Supervisor(s)	:	Dr. Pratyoosh Kumar
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SHORT ABSTRACT

In this thesis, we investigate the pointwise convergence of solutions to the Schrödinger equation on real rank one symmetric spaces of noncompact type. The study of pointwise convergence of solutions to the Schrödinger equation to their initial data is a classical problem in harmonic analysis and partial differential equations. Given the solution u(x, t) of the Schrödinger equation, a fundamental question is; whether the solution u(x, t) converges pointwise to the given initial data f(x) as $t \to 0$. This problem originated from the question posed by Carleson, which asks how much regularity to be imposed on the initial data to ensure the pointwise convergence. While the Euclidean case has been extensively studied, with sharp results established under various regularity assumptions. However much less is known in non-Euclidean settings. In this context, Sjölin has studied the regularity of the fractional Schrödinger equation in $\mathbb{R}^n$.

In a part of this thesis, we focus on the fractional Schrödinger equation on rank-one symmetric spaces of non-compact type, with radial initial data. The standard method for proving pointwise convergence involves obtaining an estimate for the corresponding maximal operator. We also proved the boundedness of the Schrödinger maximal operator.

Finally, we also study some well-posedness and local regularity results for the Schrödinger equation with a non-zero potential V on rank-one symmetric spaces.