

2026年度共同利用研究報告書

2026年08月10日

所属・職名 Indian Institute of Technology Indore・Ph.D. course in Mathematics
Navneet Redhu

		整理番号		2026a037	
1.研究計画題目	Applications of frame theory to diffraction data				
2.新規・継続	新規				
3.種別	若手・学生研究				
4.種目	短期研究員				
5.開催方法	ハイブリッド開催				
6.研究代表者	氏名	Navneet Redhu			
	所属 部局名	Indian Institute of Technology Indore	職 名	Ph.D. course in Mathematics	
7.研究実施期間	2026年05月05日(火曜日)～2026年05月17日(日曜日)				
8.キーワード	Applied Harmonic Analysis, Frame Theory on LCA groups, Wavelets, Dynamical Sampling				
9.参加者人数	9人				

10.本研究で得られた成果の概要

Motivated by the need to stably recover physical observables from incomplete, noisy Fourier diffraction data, this research extends generalized sampling to operator-valued reconstruction under measurement uncertainty. In collaborative research with Prof. Ryoko Tomiyasu (Kyushu University), we established necessary and sufficient conditions for the uniqueness of the reconstructed quantity Lg , developed a weighted least-squares formulation using diagonal standard-deviation matrices, and derived explicit matrix representations via Lagrange multipliers. Comparative discussions with classical sampling models were conducted, and test setups with B-spline and wavelet frames were prepared. As a new initiative expanding on frame-theoretic sampling, a joint manuscript is in preparation for peer-reviewed journal publication, with ongoing collaborative plans for numerical testing.

報告書は2028年4月に公開予定