

## コヒーレント光科学セミナーのご案内

インド工科大バラナシ校の Rakesh Kumar Singh 先生と大学院生の Manisha さんが  
4月17-18日に本学を訪問されます。

ついては下記の要領でセミナーを開催いたします。

散乱体を通した光学的イメージングについてお話し頂きます。

研究室の研究者、学生の皆様もお誘い合わせのうえ、奮ってご参加下さい。

\*\*\*

### Coherent Optical Science Seminar on Information Optics

Date: Tuesday, 18 April 2023

Time: 10:40-12:10

Place: Room #803, East 6 Building, UEC

Program:

10:40-11:10

Speaker: Manisha

PhD student, Indian Institute of Technology (Banaras Hindu University)

Title: Imaging with intensity correlations

Abstract:

Correlation optics has been widely used in astronomy, nuclear science, quantum optics, and so on. In this talk, we will discuss the role of correlation optics, particularly intensity correlations, in the design and development of new optical imaging methods for phase recovery and enhanced resolution. The talk covers some of our recent contributions and experiments on phase recovery in Ghost diffraction and random-assisted high-quality holographic imaging.

11:10-12:10

Speaker: Rakesh Kumar Singh

Associate professor, Indian Institute of Technology (Banaras Hindu University)

Title: Pilot assisted coherent light to see through randomness

Abstract:

Optics plays significant role in secure information delivery and in the quantitative imaging. However, presence of random scattering in the propagation channel severely affects the beam quality and conventional optics are not suited to extract useful information from the scattered wave. Nevertheless, optics with or through random scattering media is a highly practical problem. To enable imaging and extract useful non-stochastic signals through the scattering, techniques such as adaptive optics, phase coupling, and transmission matrix have been proposed. These methods require measurement and compensation of the randomly scattered wavefront. Despite the random scattering and scrambling of the light, the use of randomness through correlations of the light offers a new way and direction for information recovery and developing un-conventional imaging methods.

In this talk, we present and discuss role of the pilot assisted laser beam propagation strategy for countering the path induced randomness in the 2nd order correlation of the Stokes parameters. The Stokes parameters are usually applied for measurement of the polarization states of the light. Here, we use and describe correlations of the Stokes parameters in the lensless imaging and faithful information recovery from the coherent random light. In contrast to the previously mentioned techniques, pilot-assisted approach is capable to cancel the randomness in a real time, and preserve the desired two-dimensional information. Applications of some of these techniques will also be discussed in terms of un-scrambling the information from randomness and in determination of mode composition of the information.

Contact: Yoko Miyamoto

(Department of Engineering Science / Institute for Advanced Science,

[yoko.miyamoto@uec.ac.jp](mailto:yoko.miyamoto@uec.ac.jp))