# Simulation of SEALS (Spectrally Encoded Angular Light Scattering) in Python

## Goal

The goal of this project is to convert the MATLAB simulation of Jalali-Lab’s research paper “Spectrally Encoded Angular Light Scattering” to Python. You are encouraged to use ChatGPT.

## Introduction

The angular light scattering profile of microscopic particles significantly depends on their morphological parameters, such as size and shape. This dependency is widely used in state-of-the-art flow cytometry methods for particle classification. SEALS is a new spectrally encoded angular light scattering method, which enables the measurement of the angular dependence of scattered light from microscopic particles over a wide dynamic range by realizing a one-to-one wavelength-to-angle mapping.

## Task 1: Read the paper and understand the basics of light scattering

Read the paper in the attachment. Get a basic understanding of light scattering (including Mie scattering and Rayleigh scattering) and the experiment settings in the paper.

## Task 2: Learn the MATLAB code and previous report

Reproduce the simulation results by running the MATLAB code to further understand the experiment settings in the paper. Read the slides from our previous student to understand the code architecture.

## Task 3: Convert the simulation code to Python in Colab

Convert the simulation code to Python in Colab. No need to worry about the user input part in MATLAB. You can first use the default values and reproduce the results for Mie scattering and Raleigh scattering separately. Your deliverable should be a single \*.ipynb file with all the defined functions as well as the driver code to run simulations and plot figures.

## Contacts

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## Reference

Spectrally Encoded Angular Light Scattering, Adam, et al., Optics Express, 2013.