**Citation**

Please note that codes [DataProcessing.m/Figure\_Temp/RawData\_Rotating.mat/RawData\_Fixed.mat] is available through Matlab, and are based on a publication. If you use it successfully for your research, please be so kind as to cite our work: Siwoo Jin, Yongdeok Ahn, Jiseong Park,Minsoo Park,Wonhee J. Lee,,\* and Daeha Seo,\* ~Title, *Adv. Sci.*, ISSN: 2198-3844

**Goal**

This code is designed to measure the real-time 3D rotation of a gold nanorod, utilizing the Short-time Fourier Transform algorithm for analysis.

**How to use**

- Download all file in the same folder (This codes have been tested in MATLAB R2023b)

- Run DataProcessing.m, Figure\_Temp.m in order.

**For user modification**

To input your own data, you can modify and use the RawData\_Rotating.mat and RawData\_Fixed.mat files. The RawData\_Rotating.mat file should contain the Trajectory (x, y, intensity) you wish to measure. In this paper, image analysis was performed using the TrackMate plugin of ImageJ/Fiji (D. Ershov, M. S. Phan, J. W. Pylvänäinen, S. U. Rigaud, L. Le Blanc, A. Charles-Orszag, J. R. W. Conway, R. F. Laine, N. H. Roy, D. Bonazzi, G. Duménil, G. Jacquemet, J. Y. Tinevez, *Nat. Methods* **2022**, *19*, 829.) The RawData\_Fixed.mat serves as the reference value for comparison, representing the intensity measured by rotating a polarizer for the Fixed Au NR.

Note: In the process of inputting data, the FPS (Frames Per Second) and Rotation period of the polarizer should be the same when changing both .mat files. For other variable values, refer to the comments in the code and paper.

**Contact information.**

If you have any inquiries regarding the code or the papers, feel free to reach out via email to livewire@dgist.ac.kr. To ensure convenience, kindly use either a professional email account or Gmail.

**History**

2024.01.~ The code of measuring 3D rotation of AuNR and its test codes are uploaded.

2024.12.15 Copyright update.