

Analysis Program for Blinking Statistics of QDs in Matlab

Aditya Prasad, Department of Mechanical Engineering

Professor Saumyakanti Khatua, Department of Chemistry

Indian Institute of Technology Gandhinagar, Gujrat

Abstract and Introduction

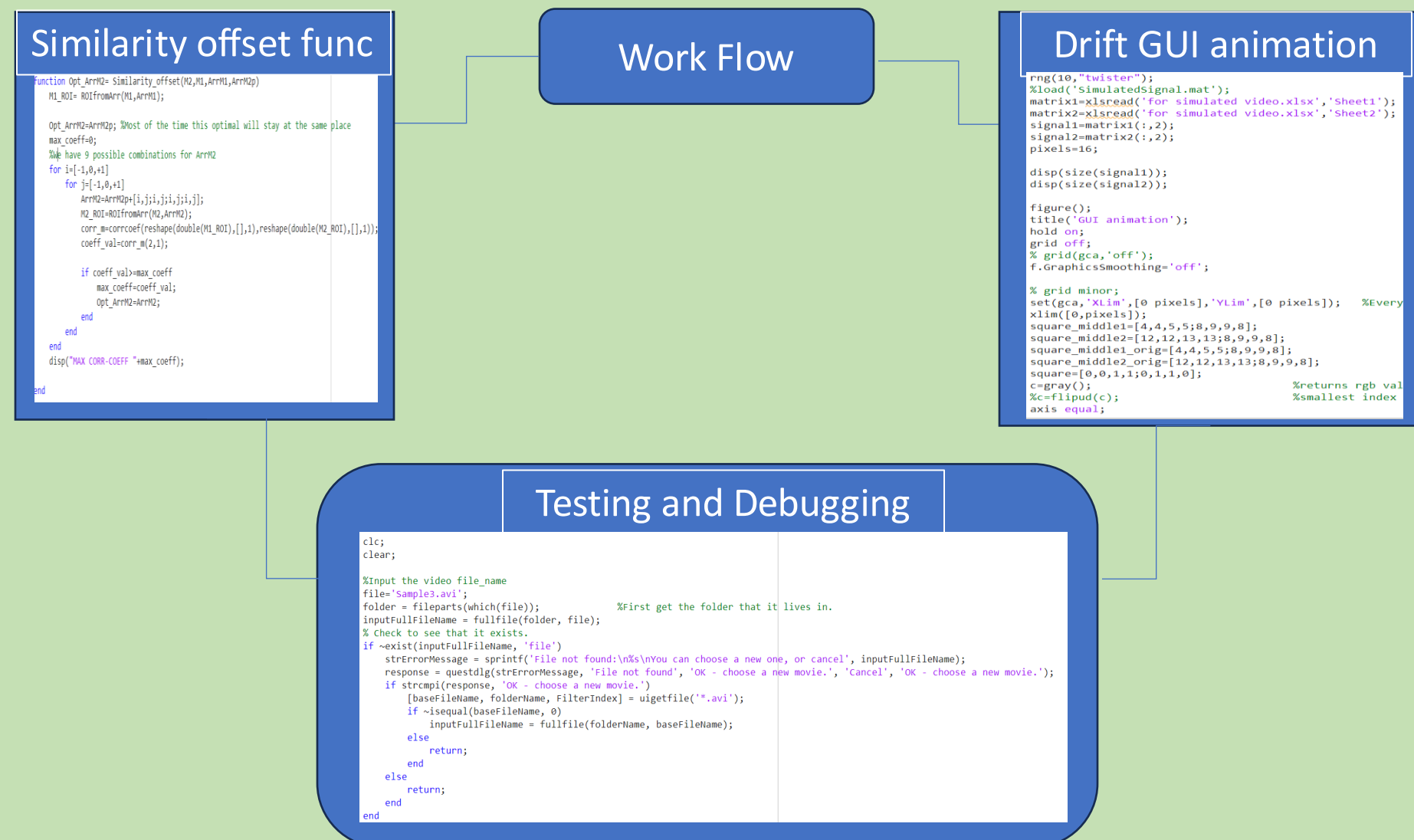
- Quantum dots(QD) are the materials of the future. They have varied applications ranging from solar plates, QLED devices, microbiology.
- Studying single particle photo luminescence blinking is of utmost importance towards improving their performance and limiting blinking.

Why Eliminate Drift in QD image traces?

- Due to scanner inaccuracies, the QD images traces have a slight drift. This drift becomes significant over many frames.
- This unwanted drift can cause hindrances in studying the blinking statistics.

Objectives and Schematic Diagrams

Implementation drift correction algorithm

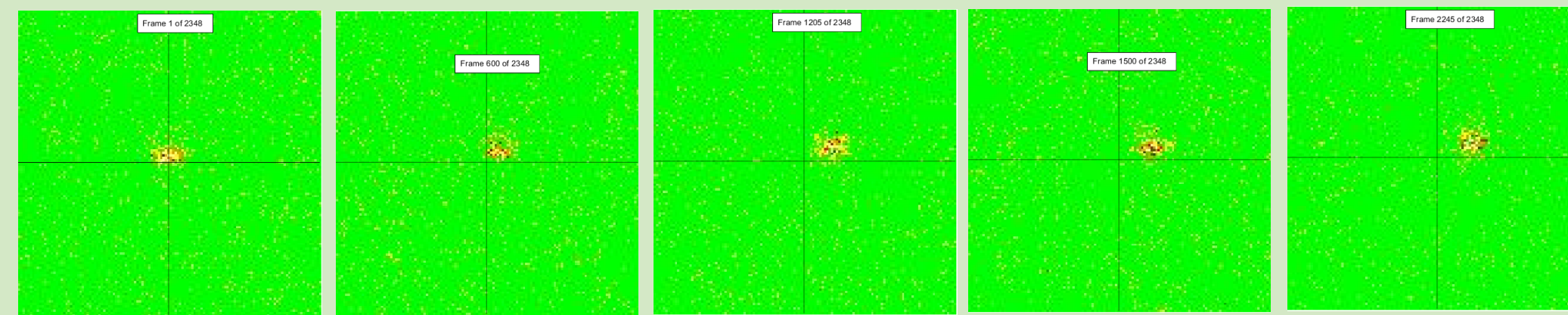


Completed List of tasks

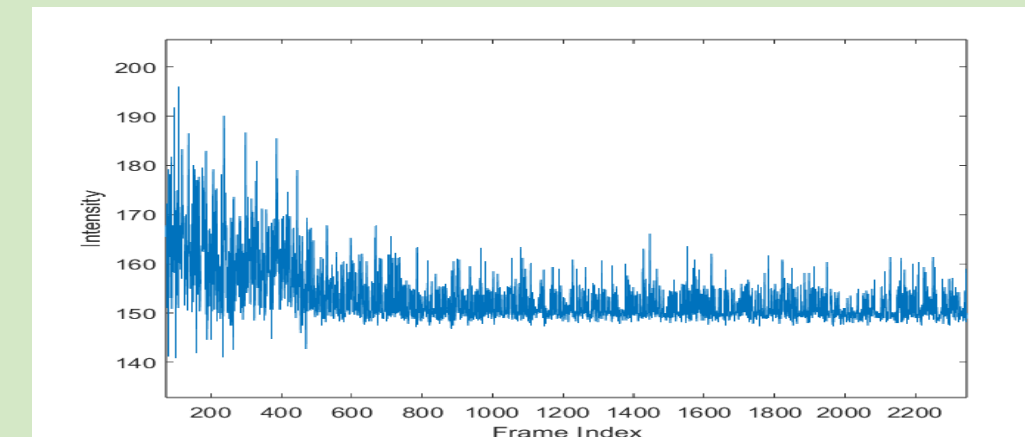
- ✓ GUI Animation with random induced drift
- ✓ Drift Correction on GUI animation
- ✓ Testing drift correction code on real video traces

Results and Discussions

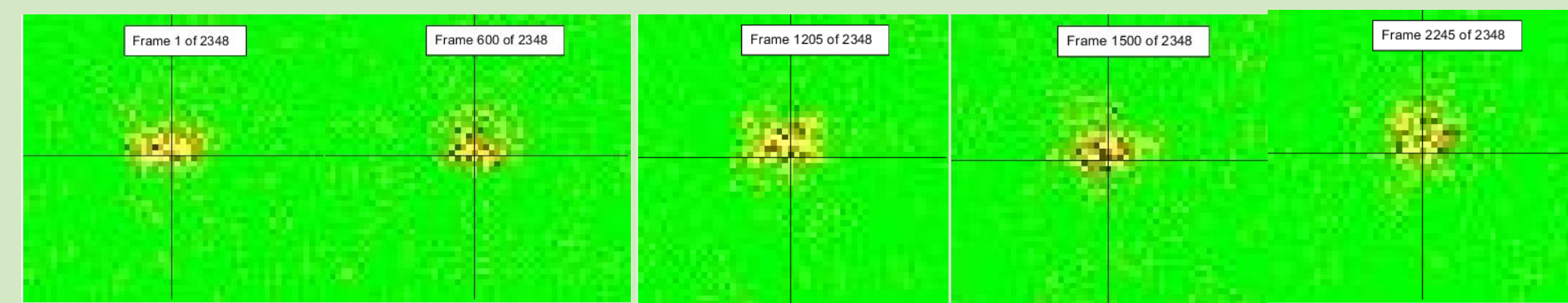
Input Trace (with drift)



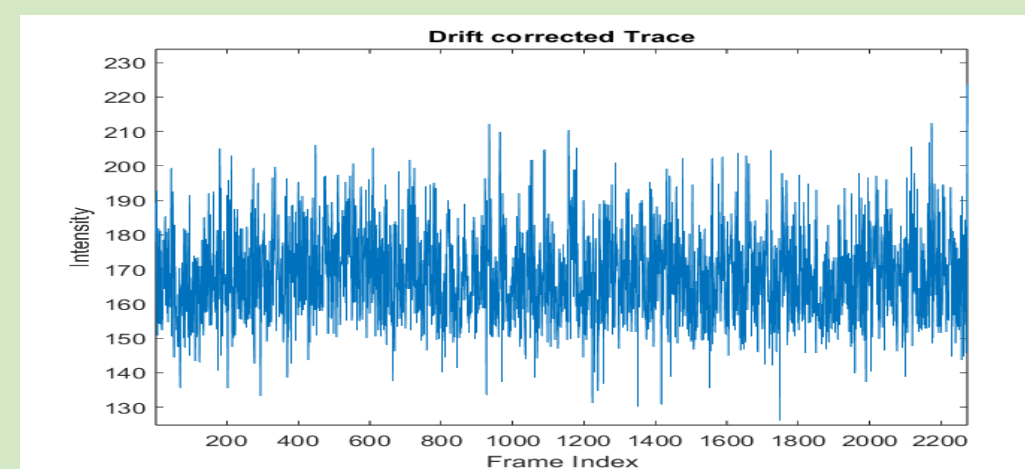
The intensity at a point bleaches-out due to drift



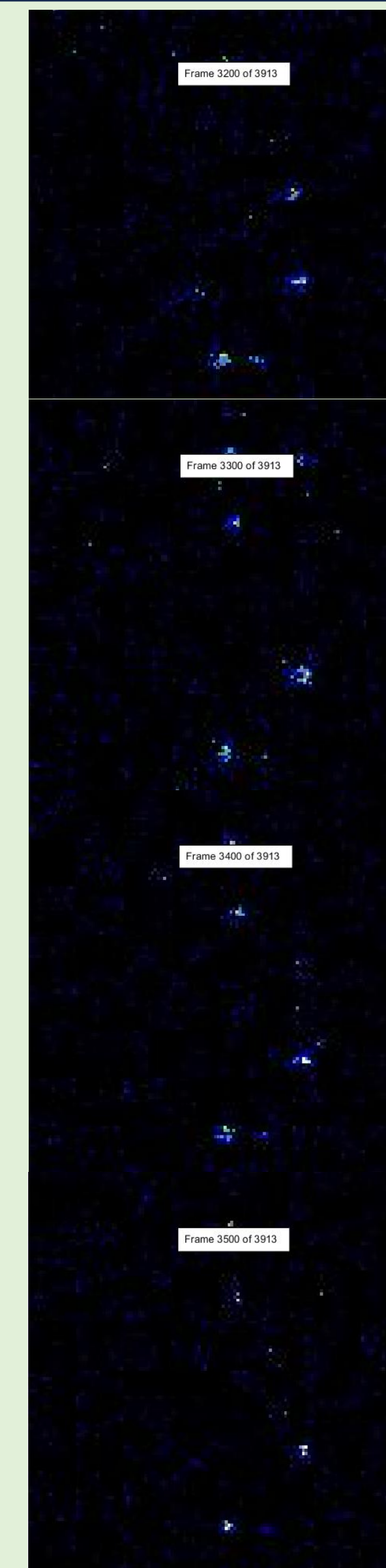
Output Trace (Without drift)



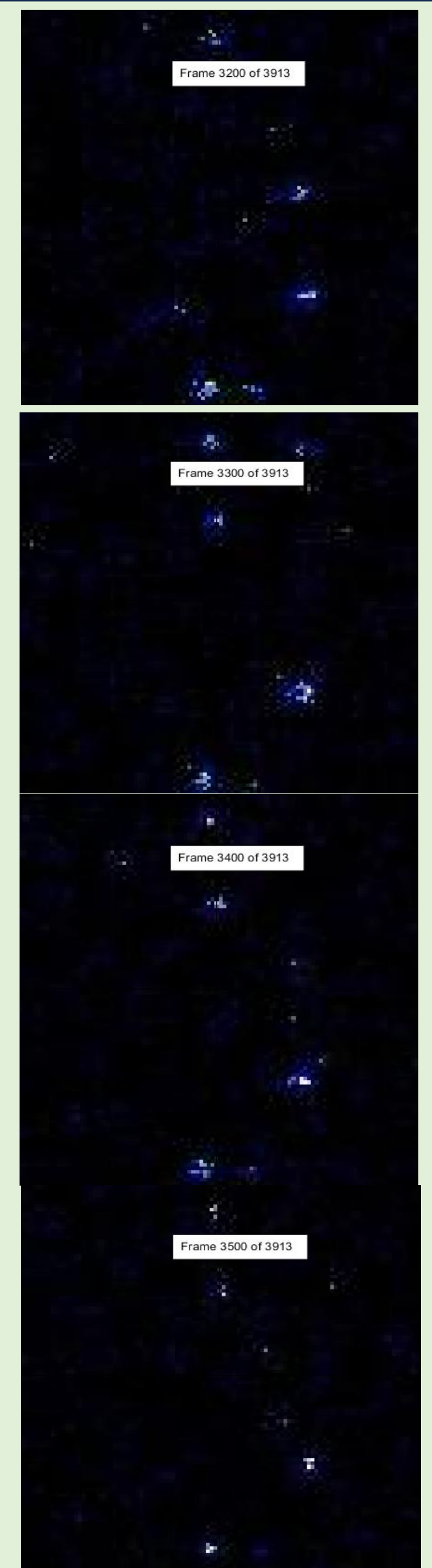
The intensity varies according to QD blinking



Before Drift correction



After Drift correction



Learnings from the Project

- This was a wonderful opportunity for me to explore the emerging field of Quantum dot chemistry and about image processing.
- I honed my Matlab coding skills through this project.

Future scope of work

- A more optimized approach towards drift correction could be implemented.
- A GUI interface for statistical analysis in an integrated environment.

I would like to express my sincere gratitude to Professor Saumyakanti and NVS Praneeth for their invaluable help and guidance to me.

Ref. Gedeberg & Li, M. (2010). *Blinking Quantum Dots: Statistics through Image Processing* (By Material Physics department of ICT schoolKTH)

<https://www.diva-portal.org/smash/get/diva2:470412/fulltext01.pdf>