Dear Automatic Portable Photonic Resonator Absorption Microscopy (ap-PRAM) users: The dynamic differential detection (D3) algorithm consists of 4 Matlab codes. The main function is “DynamicPRAM.m” while the other 3 are the sub-functions.

When you try to apply the code to a video you recorded on the ap-PRAM instrument, put the video file (mp4) in the same folder with all the 4 codes. **Remember to create a folder within the video folder, name it “diffpro”**. Then open Matlab, adjust the current pathway (see below) to the same as the codes and the video:



Next, run the code by typing DynamicPRAM(MovieDirectory,Moviename); in the command window. e.g. (on my computer, yours must have different directories):

DynamicPRAM('D:\PhD Study\Projects\AutoPRAM\DynamicCount\MATLAB','100aM-05232023182141-0000.mp4'); where the MovieDirectory is 'D:\PhD Study\Projects\AutoPRAM\DynamicCount\MATLAB' and the Moviename is '100aM-05232023182141-0000.mp4’ in this case. Then press “Enter” key. The code will start to run and process the code. The raw image frames will generated in the same folder, while the differential image frames will be generated in the folder “diffpro”.

Note:

1. In the lines 4 and 9 of the code DynamicPRAM.m, you can change the frame interval, and endFrame, which will change the number of frames between two frames used for differentiation and the total number of frames from the beginning. For example, here is the running result of the demo video “100aM-05232023182141-0000.mp4” with interval=2, and endFrame=30:



The data points have an interval of 2 frames, and the code processed the first 30 frames in total, so you will end up with 15 data points for the npc (nanoparticle counting).

1. All the processed data will be stored in a data file, named “data.mat”. Where you can input them into excel or Origin for further processing.