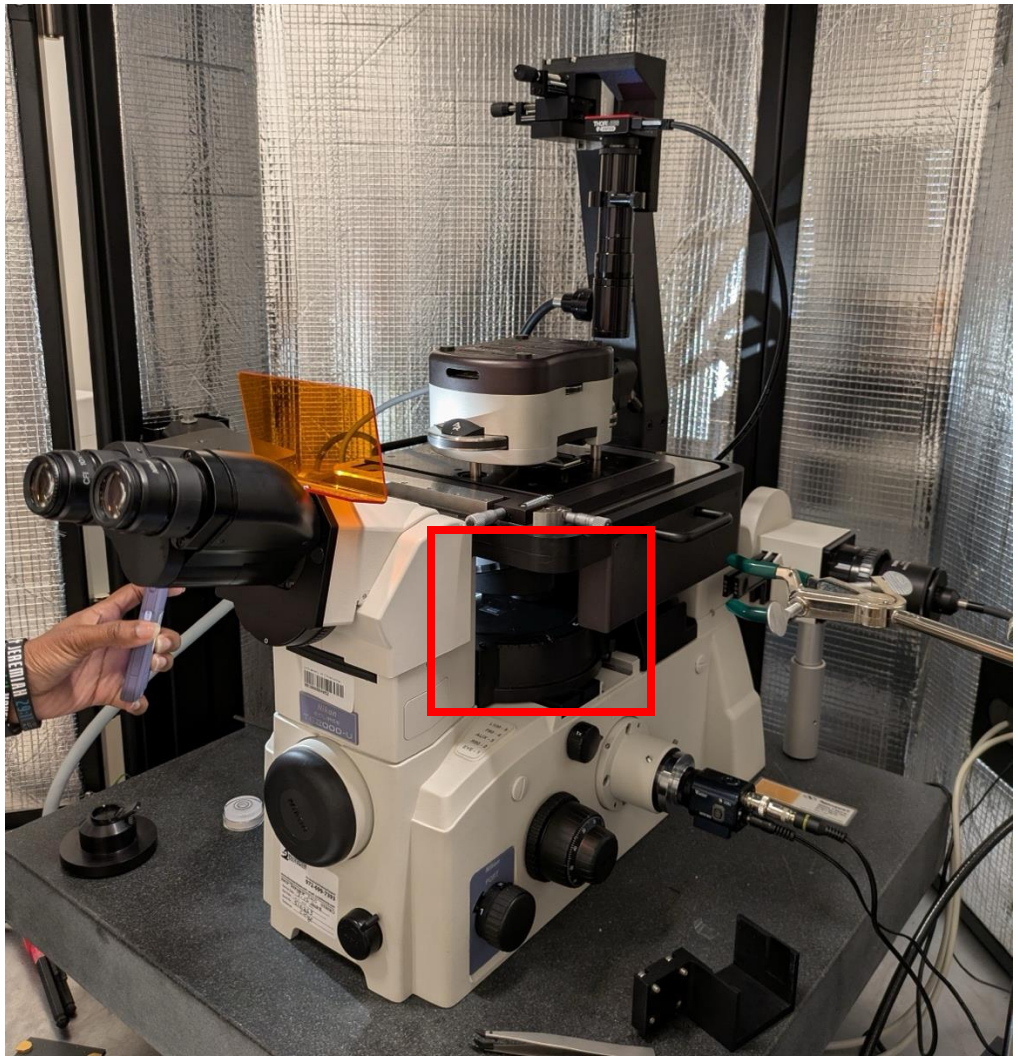
Rotating Polarizer for an Atomic Force Microscope

Aiden Guild

Objectives for the summer

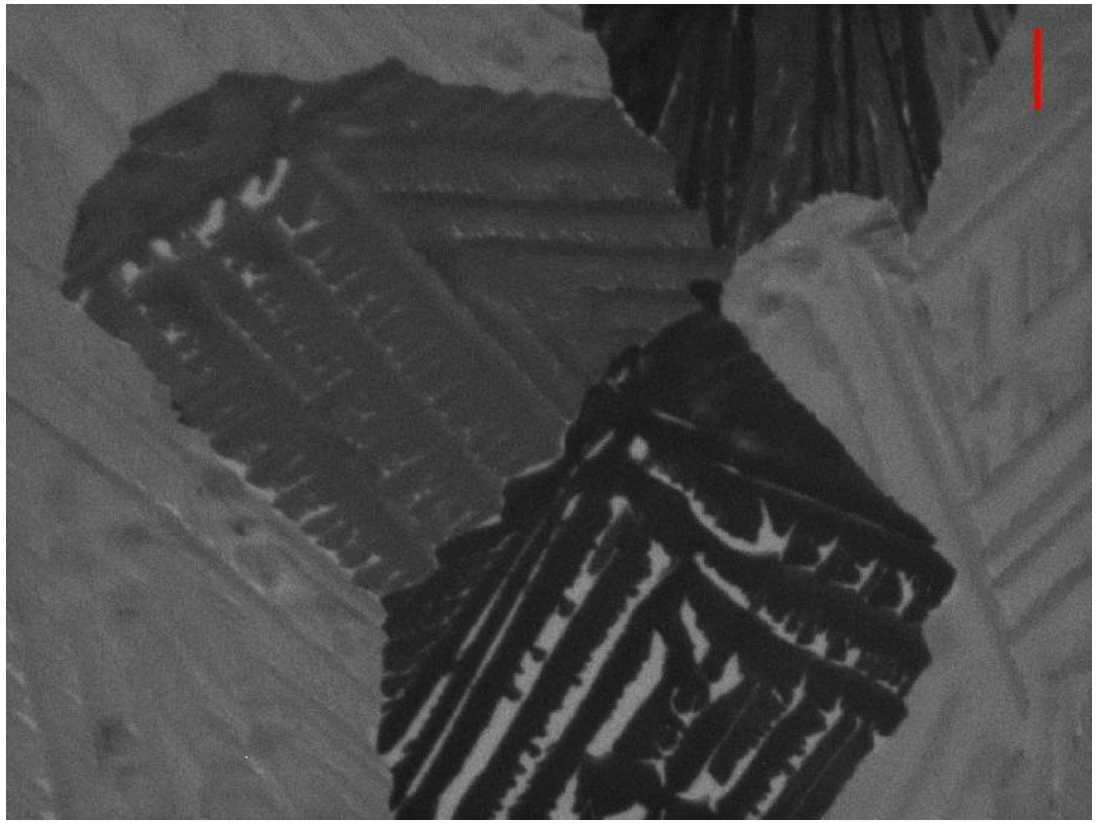
- Polarizer that can rotate 360 degrees
- Affixed to a motor
- Set above the light source, but below the lens

Atomic Force Microscope



Motivation - Dichroism

- Anisotropic materials
- Phthalocyanine – dichroism
- Simpler to rotate the polarizer within the AFM

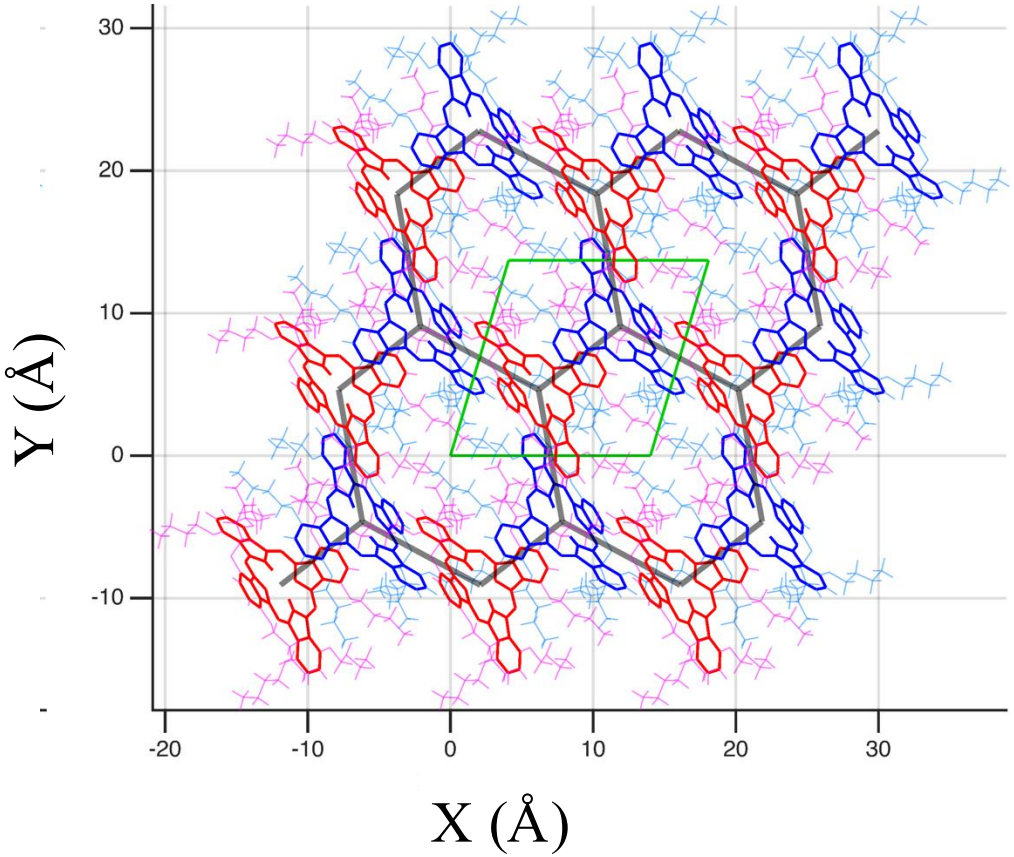


Phthalocyanine under rotating polarized light

Motivation - Photoconductivity

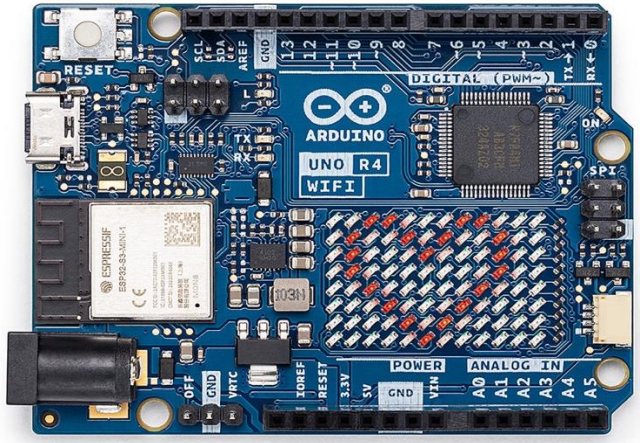
- Photoconductivity – material's electrical properties change when exposed to light
- Phthalocyanine absorbs most strongly along this diagonal axis
- Rotate polarizer without interrupting measurements

Phthalocyanine Crystal Structure (Top Down)



Rotary Encoder

Arduino Board



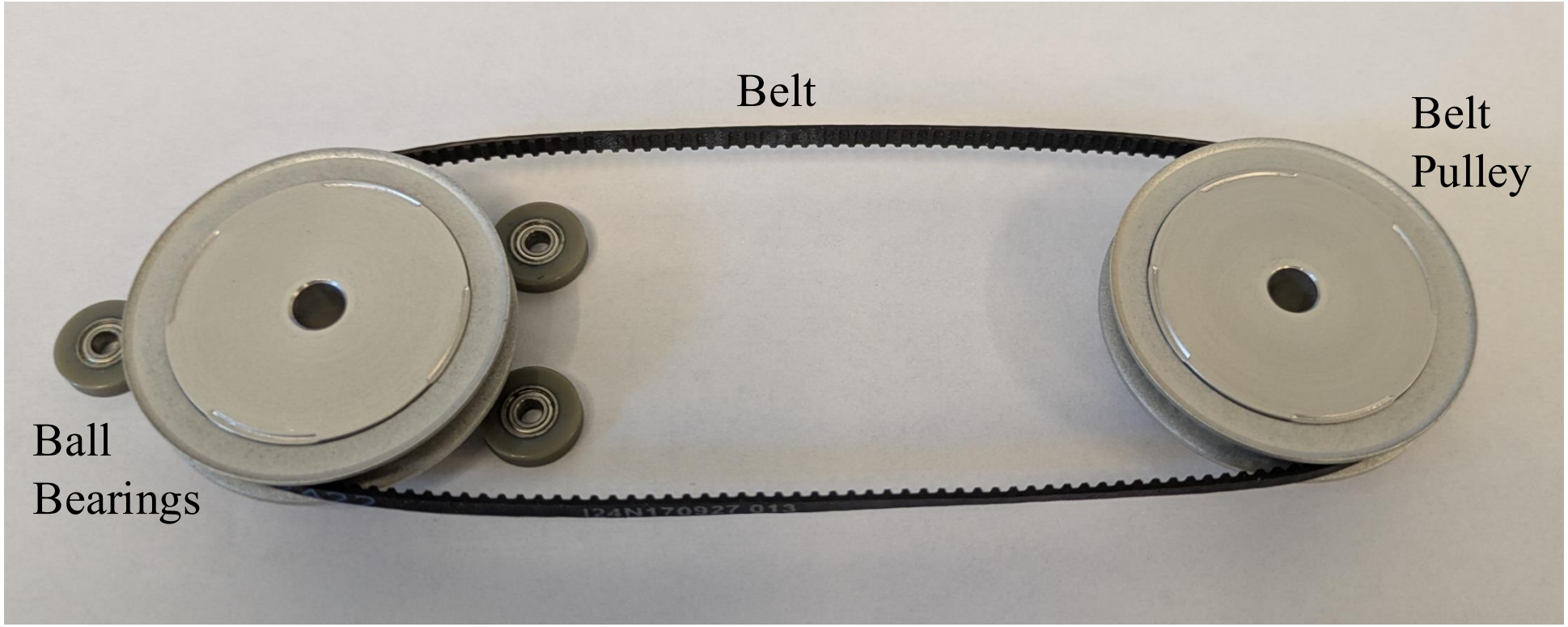
Stepper Motor

The Electronic Side

- 2 main components: mechanical and electronic
- Electronic components: Rotary Encoder, Arduino Board, Stepper Motor
- Rotary Encoder --- Input device
- Arduino UNO R4 --- Drives the stepper motor
- Stepper Motor --- Rotates the polarizer

The Mechanical Side

Mechanical Components: 2 Belt Pulleys, Belt, 3 Ball Bearings



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