# High-Speed Camera System

An embedded system for visualizing fast chemical reactions in slow motion

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## Introduction

**Fast polymerization reactions triggered by UV light happen too quickly to be captured by the human eye or standard cameras.** We present a low-cost system that detects the UV flash and records the reaction using high-speed imaging, enabling slow-motion playback for detailed observation and live demonstration.

## System Architecture

UV Flash Occurs

UV Detected by Analog Sensor

Raspberry Pi 3 detects the UV signal from the sensor

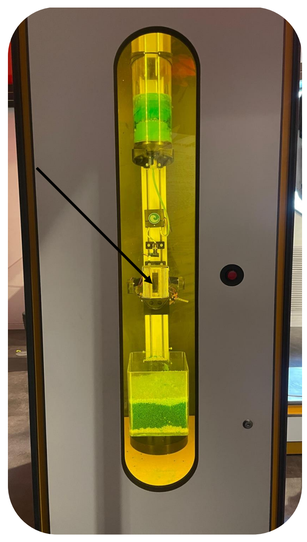
High-Speed Camera Captures Frames

Frames Buffered in RAM

Buffered frames are played on an HDMI display in slower speed

Playback Controlled via Buttons (Play / Pause / Reset)

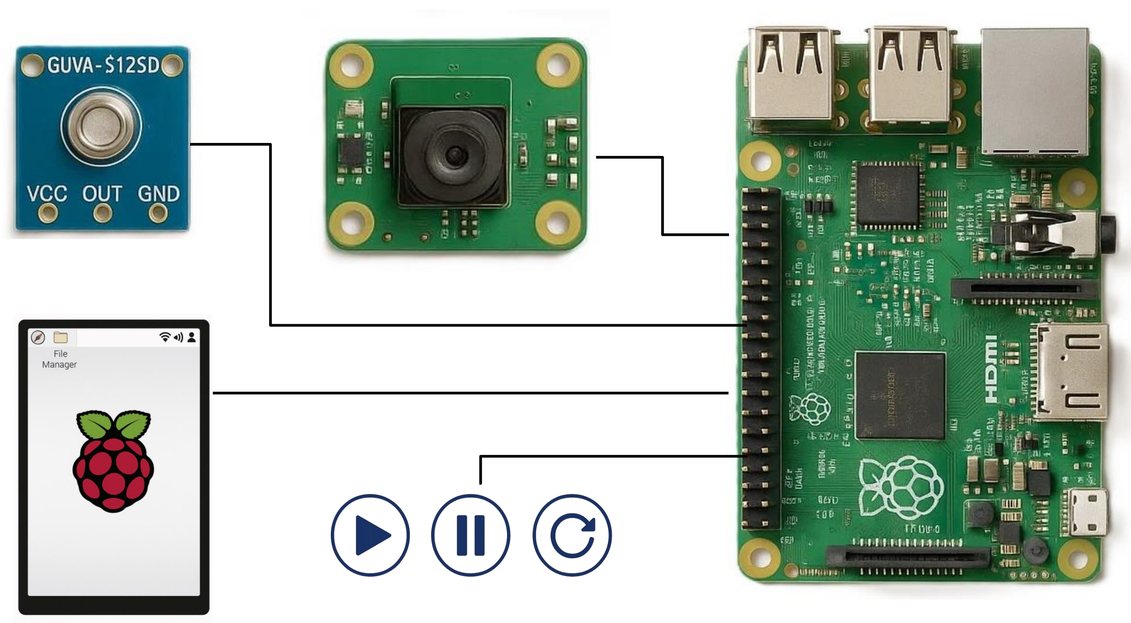
## Polymerization Exhibit



Museum exhibit showing the polymerization setup. A small ROI, marked by the arrow, is captured by the high-speed camera during UV-triggered solidification.

## Optimizing Capture Speed


## System Hardware Overview




## Hardware Components Cost

| Component | Price |
|---|---|
| Raspberry Pi 5 | 50$ |
| Raspberry Pi Camera Module v2 | 20$ |
| External ADC | 3$ |
| GUVA-S12SD UV Sensor | 7$ |
| HDMI Display | 30$ |