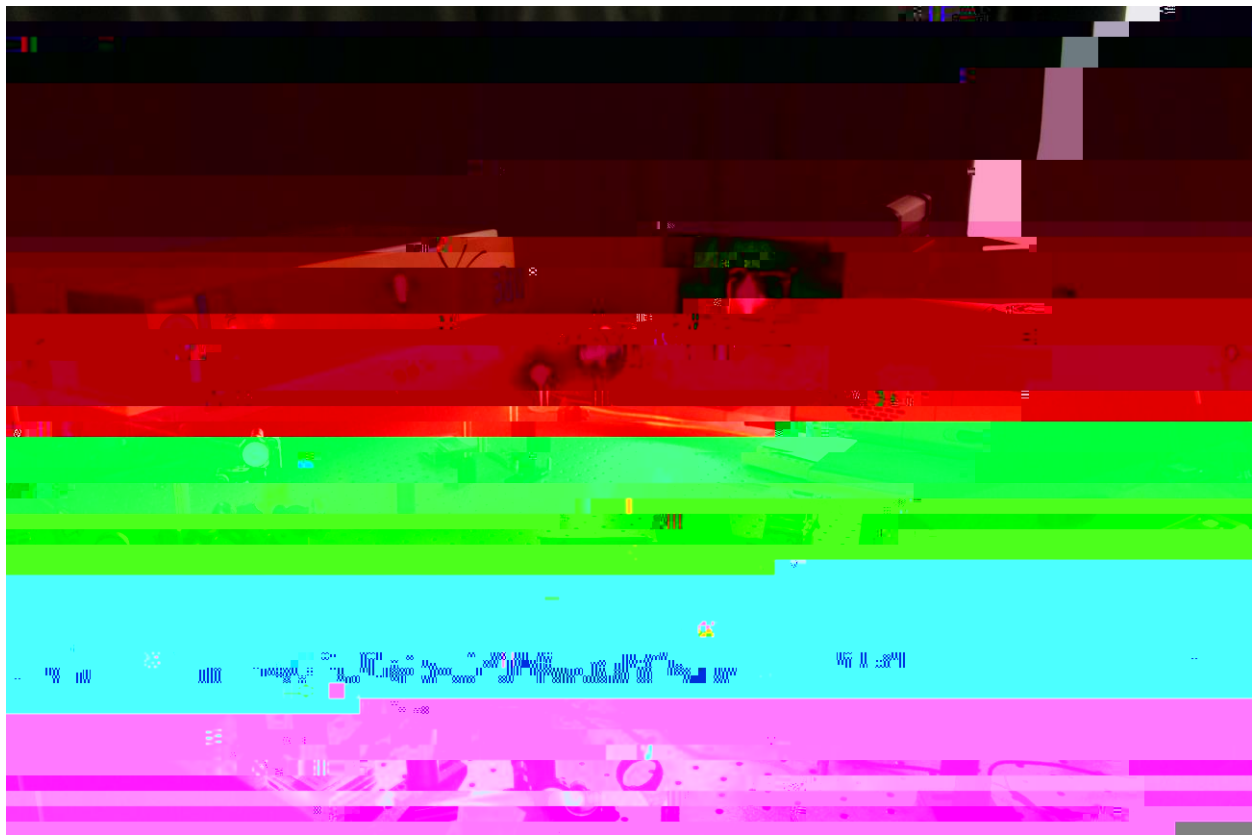


Detecting Material Defects using a Scanning Laser Beam

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Thermal Non Destructive Testing (TNDT) is one non-destructive testing method that facilitates the detection of subsurface defects in materials and prevents potential failure using a transient (active) or steady-state (passive) procedure. A stable energy source is necessary when implementing a transient process. In this research, a laser beam is used for this purpose. The biggest benefit of using a laser beam is that the energy input is being focused on a relatively small area. This makes the experiment more sensitive to defects and therefore more effective. A FLIR 8000 thermal camera is used to record the temperature distribution on the non-heated side of the sample.

The laser beam applied is used as a source of a moving linear energy input. To simplify the experiment, the testing material is moved through the laser beam at a constant velocity of 10 mm/s. The temperature distribution is recorded using a thermal camera.

Figure 2: Non-linear regression of experimental data matched with numerical model using MATLAB

Figure 3: Temperature distribution surface plot.