Dual-Energy CT Scanning SOP

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Filter Switcher Placement

1. Run CT Warmup (under Scan tab)
2. Place Filter Switcher onto CT scanning bed
3. Ensure bed **height = 266.9 / 267.0 mm**
4. Ensure bed is fully retracted
5. Place filters within CT bore
6. Mount acrylic clam-shell
7. Hook-up filters with Filter Switcher via 2 nylon screws
8. Wire Filter Switcher via DB9 cable
9. Plug in Trigger and DB9 cable into BLACK BOX

Sample Placement

1. Place sample inside provided pink foam bed and held down with double-sided tape
2. Place foam bed onto end of CT scan bed and center sample/ROI with CT lasers
3. Set CT landmarks/reference point

Filter Switcher Homing

1. Switch dial on BLACK BOX to desired mode (Mode 1 = 26 counts, Mode 2 = 920 counts, **Mode 3 = 12020 counts**)
2. Power BLACK BOX with provided 9V 2A power supply (plugged into wall)
   1. This will home the filters
3. Line up Er filter center line with CT lasers (above sample)
4. Screw down black know (located at the back of the Filter Switcher)
5. Hit Forward on the BLACK BOX to ensure copper filter lines up with CT lasers
6. Turn off CT lasers
7. Close CT hutch
8. Hit Move to CT Scan Plane

Selecting Dual-Energy Protocol via CT Console

1. Hit yellow button (left of CT console)
2. Select the following:
   1. Project = Erbium
   2. Exam = Default
   3. Specimen = sample#\_yyyy/mm/dd\_operator
   4. Protocol = DE\_2Sequence\_70\_90\_2hr\_Delay\_JJT
   5. Ensure floating point values for
      1. High Energy
         1. Air = 3.3
         2. Water = 11.6
         3. Bone = 33
      2. Low Energy
         1. Air = 1.5
         2. Water = 11.45
         3. Bone = 22
3. Switch dial on BLACK BOX to FL (CT Fluoro mode)
4. Hit CT Fluoro on GE Console
5. Ensure sample placement
6. Switch dial on BLACK BOX back to mode chosen beforehand
7. Hit Run Protocol

Troubleshooting

If filter center-lines do not line up with CT lasers

1. Connect via USB-B port on back of BLACK BOX to a laptop loaded with Arduino (1.6.5) software (<https://www.arduino.cc/en/Main/Software>)
2. Open BLACK BOX code in Arduino software
3. Change values for “pos” and “backup” (near top of code)
   1. Default
      1. Pos = 8300
      2. Backup = -10700
   2. Backup = Initial position after the Filter Switcher homes (ie. Back position)
   3. Pos = Number of pulses RELATIVE to backup position (ie. Forward position)