# Image Quality Improvement in CT Head Pad

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## BACKGROUND:

For patient comfort there is a requirement for a pad to lie below the patient's head during CT imaging. One critical consideration in head pad design is the ability for the technologist to visualize the ears in order to properly landmark the patient.

Therefore, there is a strong desire to have a cutout of the head holder for the ears. Traditional designs for head pads have **sharp transitions** around the ear cutouts which lead to **image artifacts**.

## METHODS:

1. A new head pad was developed with chamfered ear cutouts.
2. A water phantom was imaged with 10 new chamfered prototype pads.
3. An **artifact metric (AM)** was defined based on the ratio of the **image standard deviation (SD)** within artifact regions compared to a non artifact region.

## RESULTS:

- The artifact metric provides the standard deviation contribution due to the head pad, normalized by the noise in the image.

- **Traditional head pad AM=17.9%**
- **Chamfered head pad AM=3.0%**

# Chamfered ear cutouts, enable laser alignment to the ears without **image artifacts in reformat planes**.
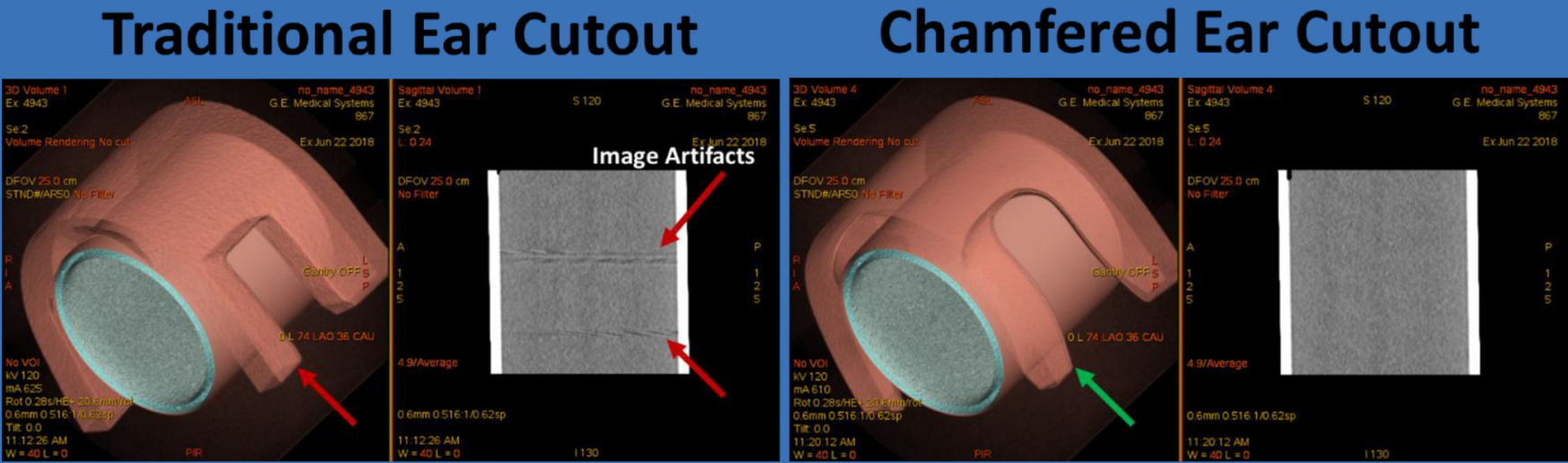


**Traditional Ear Cutout** — **Chamfered Ear Cutout**

Figure 1.

$$Artifact\ Metric\ (AM) = \frac{|SD\ Ear\ cutout - SD\ center|}{|SD\ center|}$$



Ear Cutout ROI
Center ROI
Ear Cutout ROI

Figure 2.  AM=17.9%  AM=3.0%