

# DBT IMAGE QUALITY INVESTIGATION: A PHANTOM STUDY

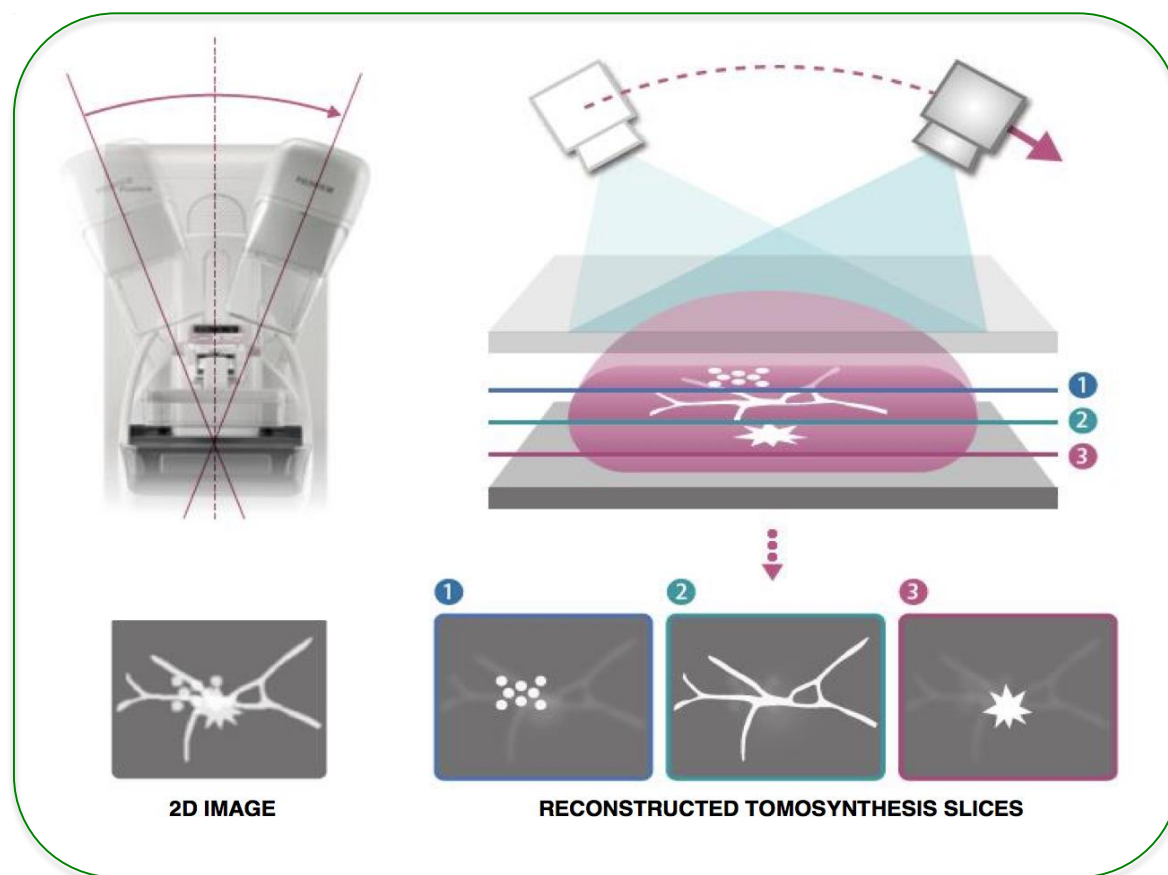
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# Introduction

Tomosynthesis acquisition allows to overcome tissue superposition proper of 2D standard mammography



# Purpose

1. To assess DBT image quality with a dedicated phantom
2. Suggest a practical way to evaluate image quality in BDT with a dedicated phantom



# Materials and Methods: DBT system

## Fujifilm Amulet Innovality

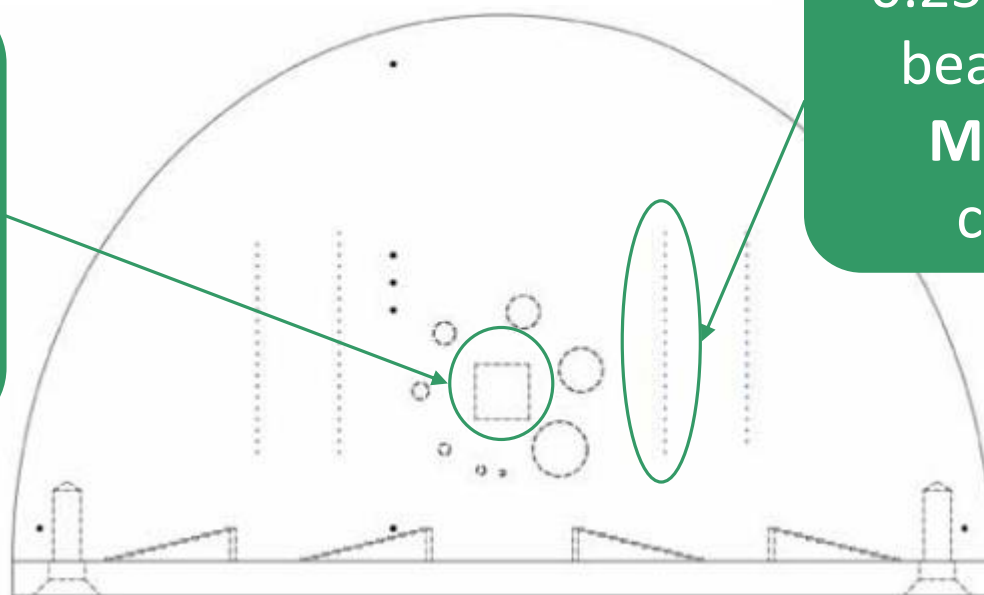
	High Resolution (HR)	Standard Resolution (ST)
Pixel size (mm)	100	150
Sweep angle (deg)	40	15
Number of projection	15	



# Materials and Methods: phantom

## Schematic drawing of Tomophan<sup>®</sup>

Aluminium square for **SDNR** evaluation



0.25 mm stepped beads ramp for **MTF** and **PSF** calculation

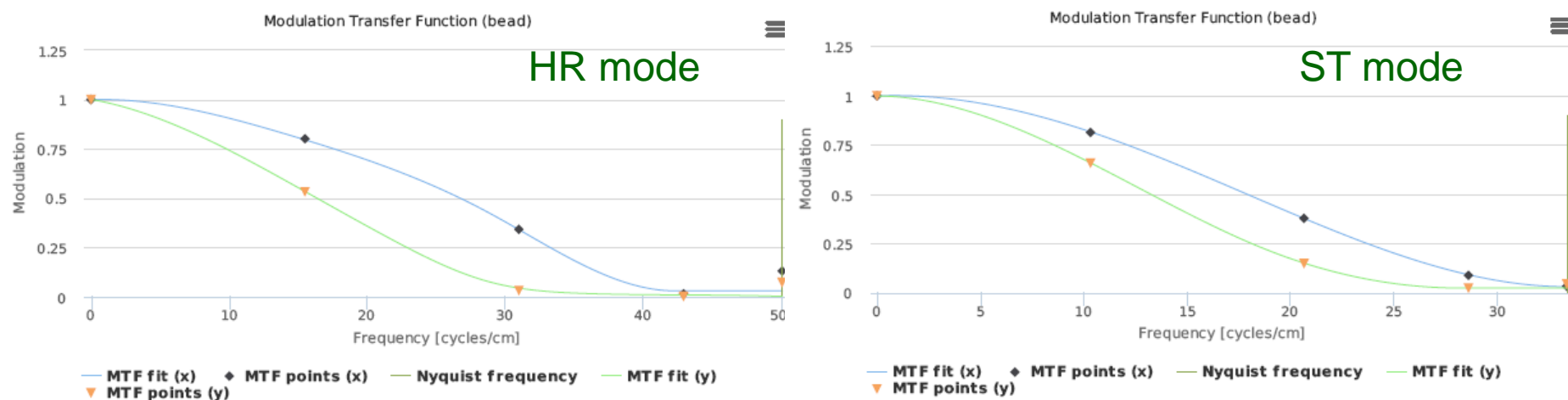
IQ parameters studied:

- in – plane resolution → MTF
- z – resolution → PSF
- Low contrast resolution → SDNR

Software used:  
Tomophan<sup>®</sup> QA  
ImageOwl Inc.

# Results: in – plane resolution

Evaluated from one bead in the ramp

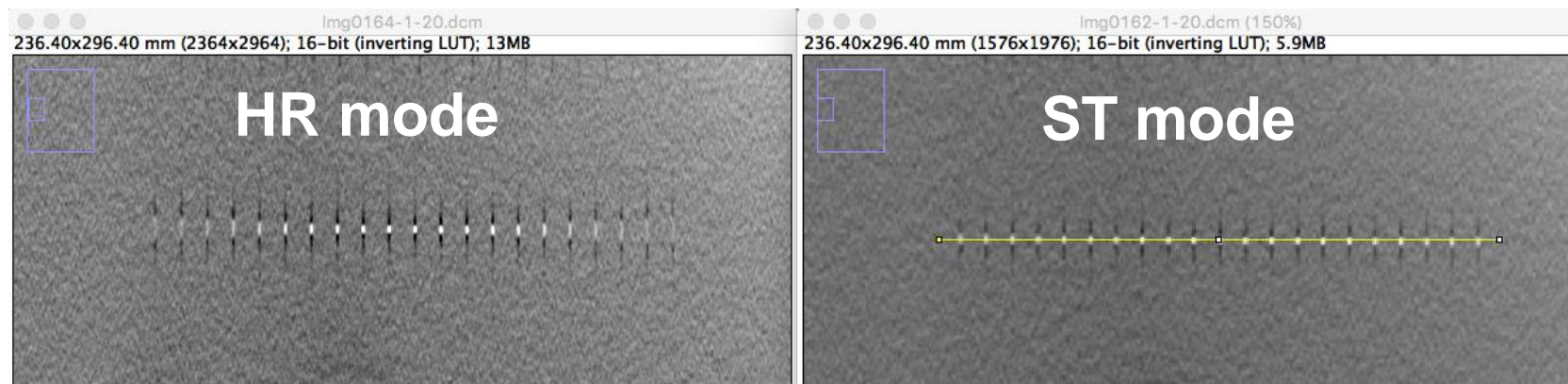


HR mode

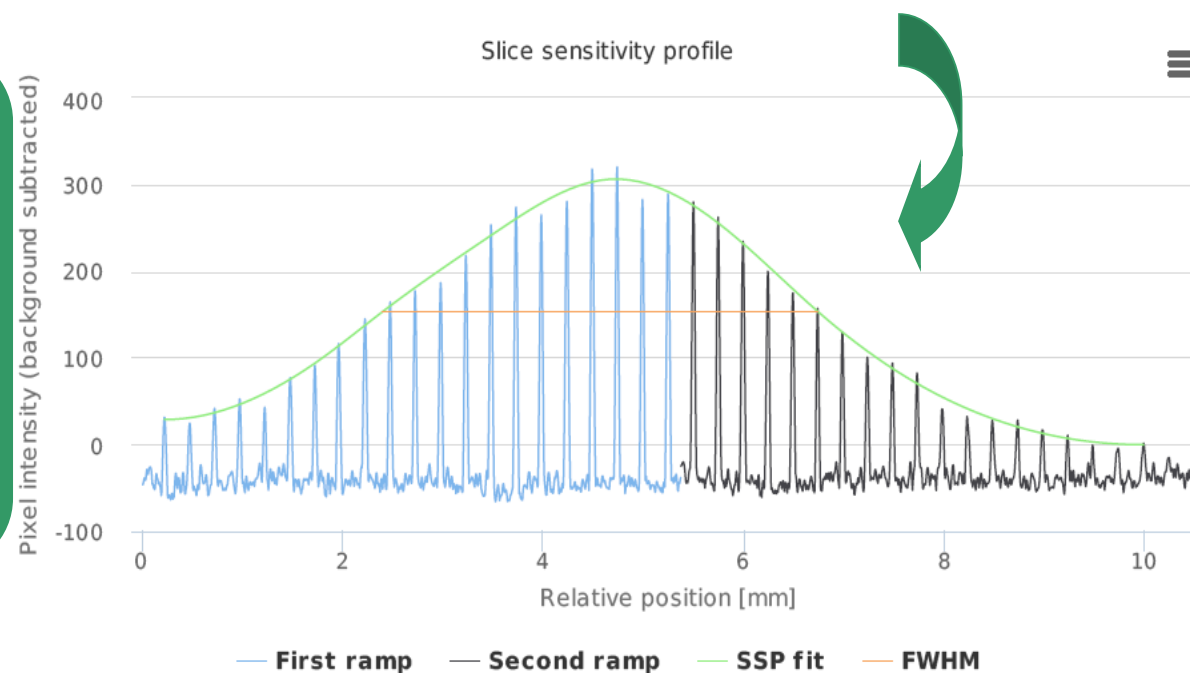
ST mode

Direction	50%	10%	50%	10%
Chest wall - nipple	2,7	3,7	1,8	2,8
Tube Travel	1,6	2,8	1,3	2,2

# Results: z – resolution



1. Intensity profile across the ramp in y direction

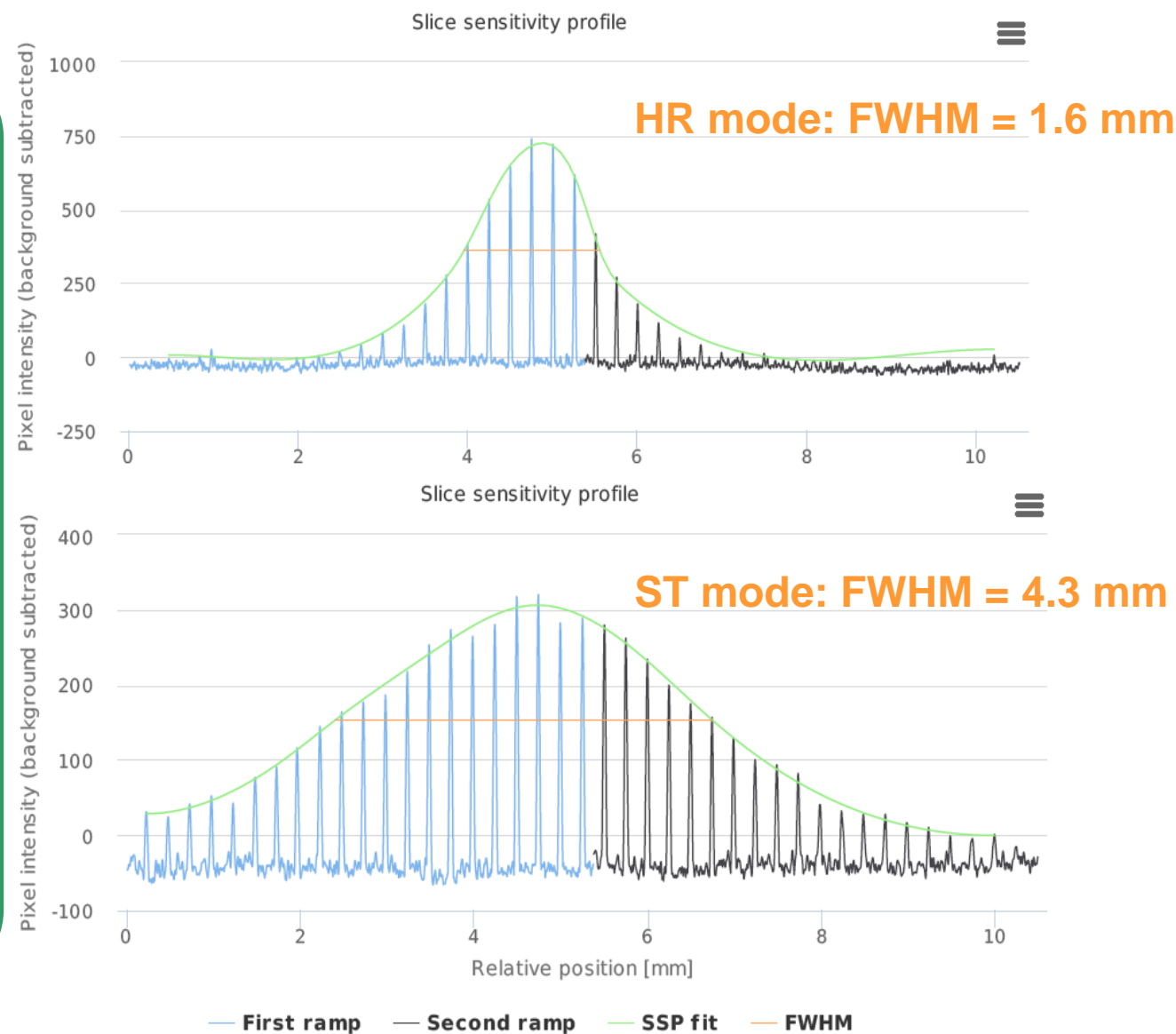


# Results: z – resolution

2. Peak over the half max (N)

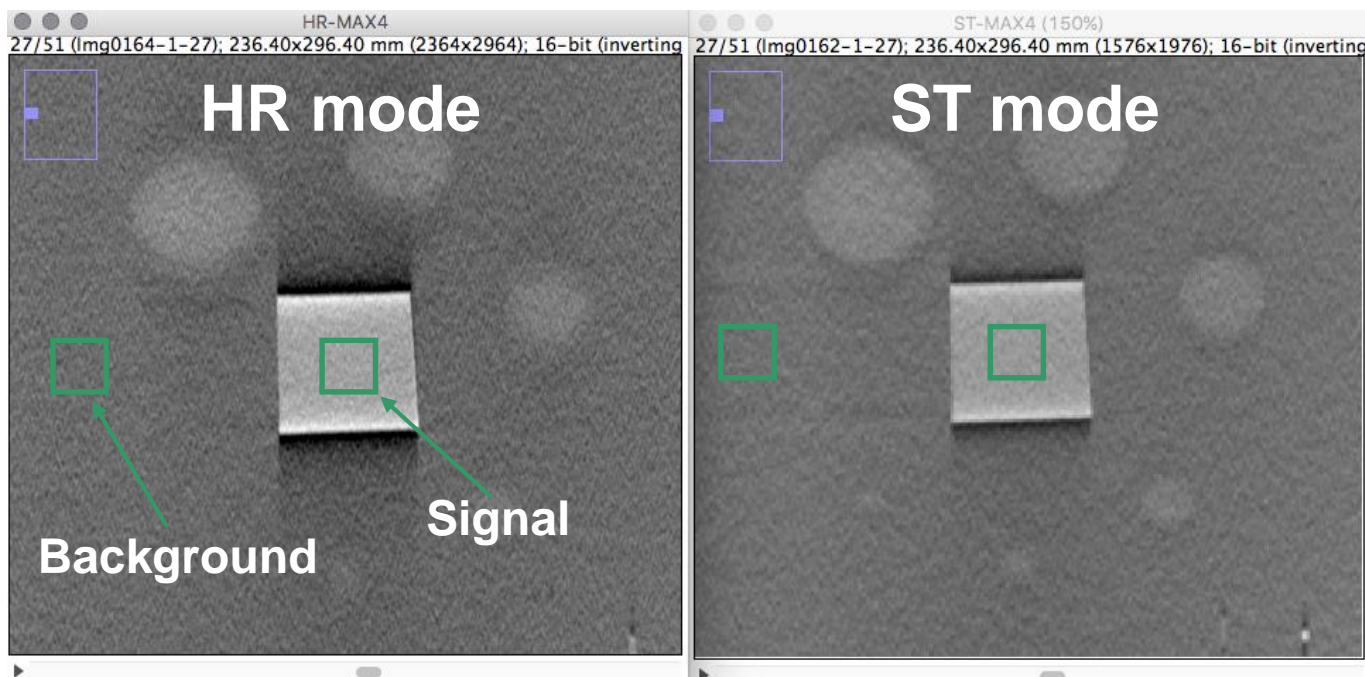
3. Distance between beads ( $d = 0.25$  mm)

4.  $\text{FWHM} = N * d$





# Results: Contrast to noise ratio



	HR mode	ST mode
CNR	7,2	7,8
Dose/projection	0,4	0,2

# Conclusion

- Quantitative image quality evaluation in DBT could be **easily** assessed with the Tomophan<sup>®</sup> phantom
- Images can be analysed with the related software web based
- This phantom is suitable to be integrated in a Quality Assurance Program for Tomosynthesis systems