# ENHANCEMENT OF RADIOSENSITIVITY OF DOSE GELS

Stevan Vrbaški*, Judita Puišo*, Diana Adlienė*, Marija Kaziukaitienė**

*Kaunas University of Technology, Kaunas, Lithuania

** JSC "Affidea" Medical diagnostic imaging center in Kaunas, Lithuania
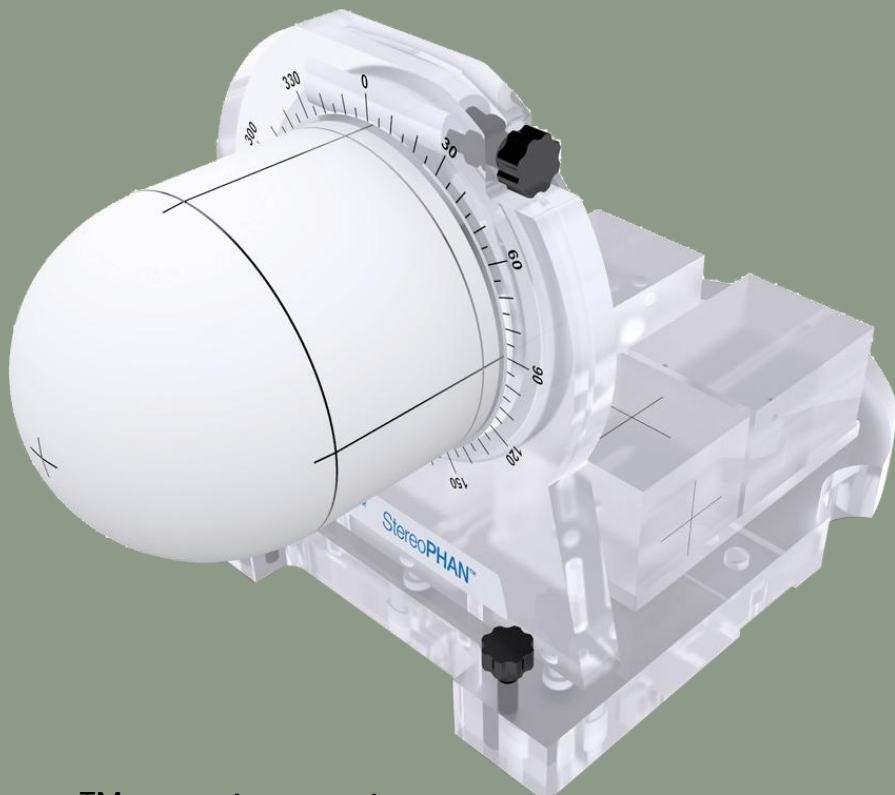
steva.vrbaski@gmail.com

# Overview:

1. Dosimetry in practice
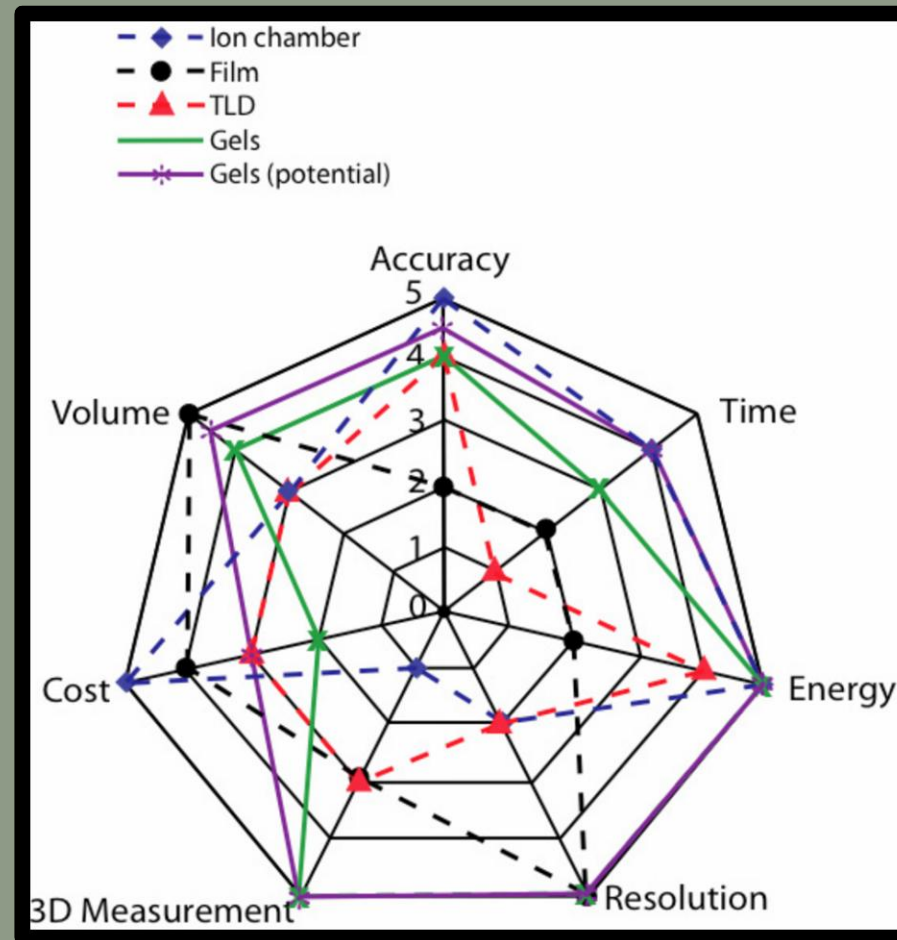2. MAGAT (and other polymer) gels
3. Dose enhancement
4. Conclusion

# 1. Dosimetry in practice

Treatment plan verification – it's a 3D dose distribution!

QA phantoms – multiple detectors



StereoPHAN™ – End to end Stereotactic commissioning & QA phantom

Oldham et al.
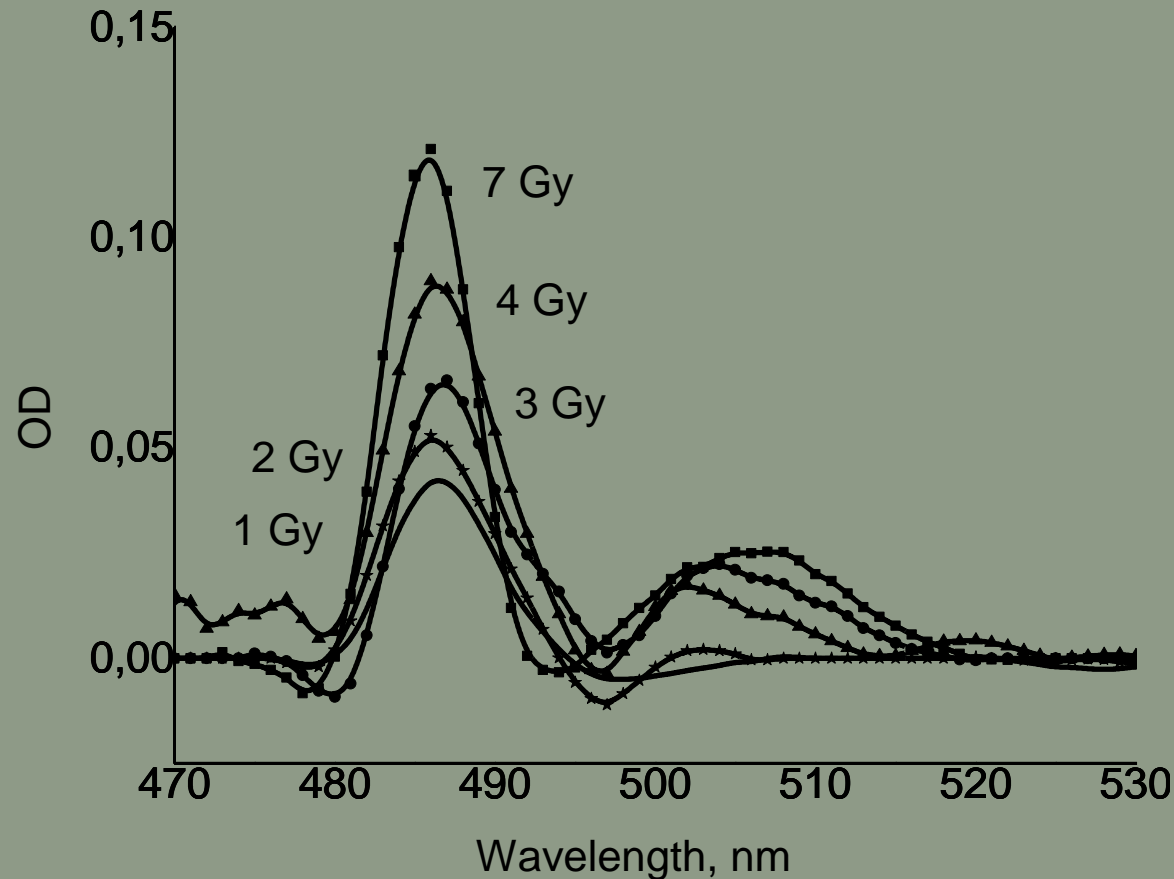
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# 2. MAGAT (and other polymer) gels

IMRT, VMAT, SRS and IT
steep dose gradients

- Real and complex measurements of 3D dose distribution
- Tissue equivalence
- Low or no dose rate dependence
- High spatial resolution
- Lack of energy dependence

| MAGAT II | |
|---------|---------|
| Water | 88% |
| Gelatin | 5% |
| MAA | 7% |
| THPC | 10 mM |

# 3. Dose enhancement



- Formation of secondary peaks – Ag nanoclusters were formed
- Surface plasmon resonance at 486 nm – rough estimation of 70 nm cluster size
- Steady position of peaks – indicates no formation of clusters of different shape or size

# Future work: MAGAT gels + AgNO3
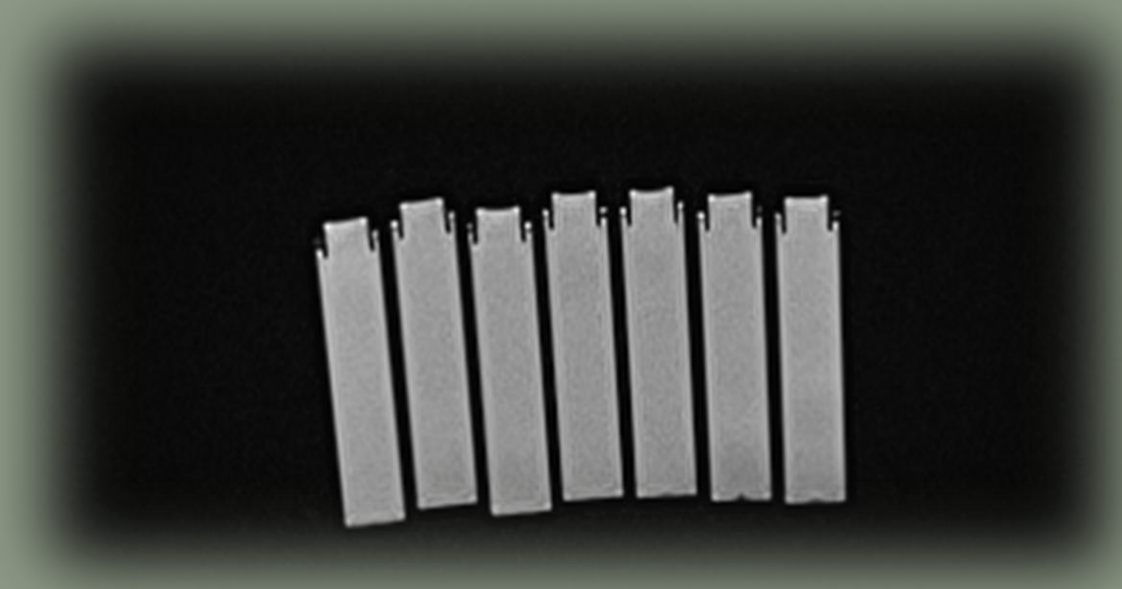


- Gels already polymerized after 48 h of storage in dark place
- Oxygen scavenger THPC contains Cl which most probably was reacting with $AgNO_3$

# 4. Conclusion:

- No competition in terms of experimental verification of clinical 3D radiotherapy

- Linear dose response of dose gels was estimated when optical UV-VIS method

- MRI evaluation performed on gels didn't show linear dose response, however the sensitivity of MRI method was almost twice higher

- Due to formation of silver nanoclusters in irradiated gels it is possible to enhance gel sensitivity by at least two times.

# Collaboration and acknowledgement:

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MRI imaging

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Irradiation – Varian linac