

Despite popular belief kilovoltage x-rays can go a long way (in therapy)

X-ray Imaging and Therapy Experimental

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University of Victoria 3D X-ray CT and MRI Scanner

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Kilovoltage x-rays

Diagnostic imaging How about radiation therapy?

high tissue attenuation low machine output

2

Kilovoltage arc therapy (KVAT)

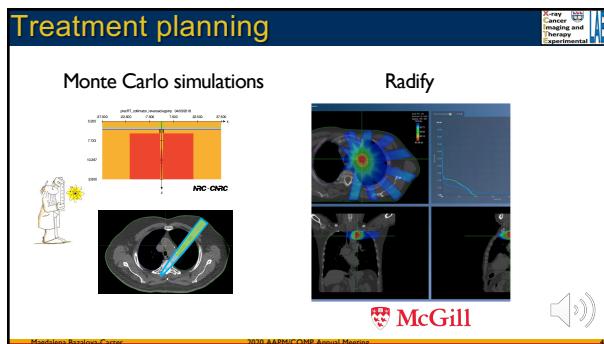
SBDX source KVAT source

(a) detector array a) x-ray source design

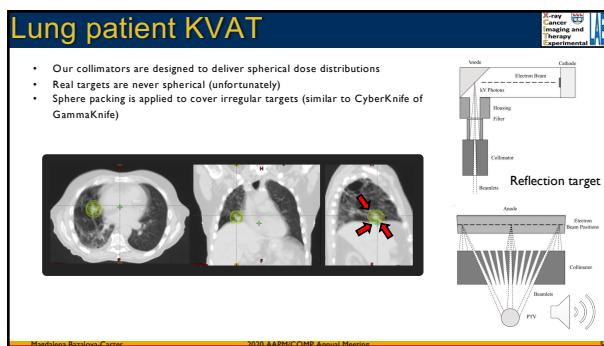
(b) phantom with target b) phantom with target

200 kV beam Design by Precision RT

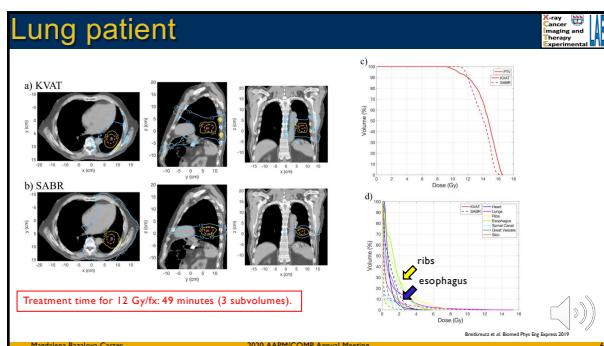
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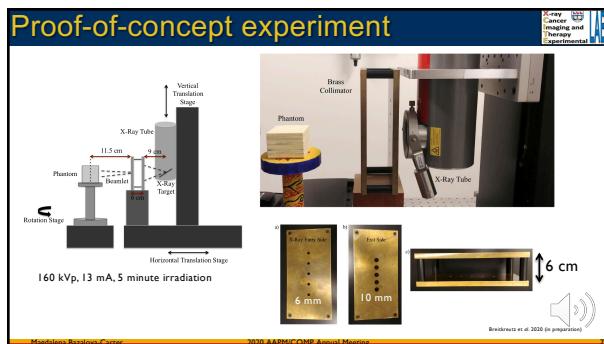
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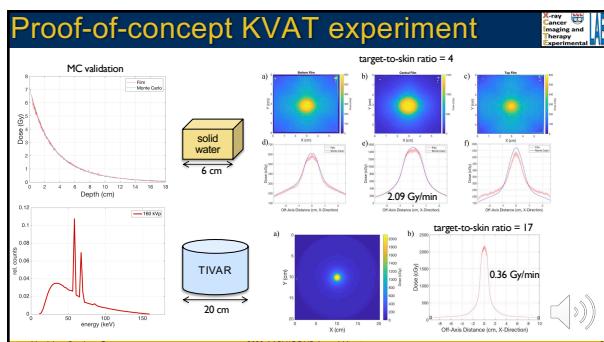
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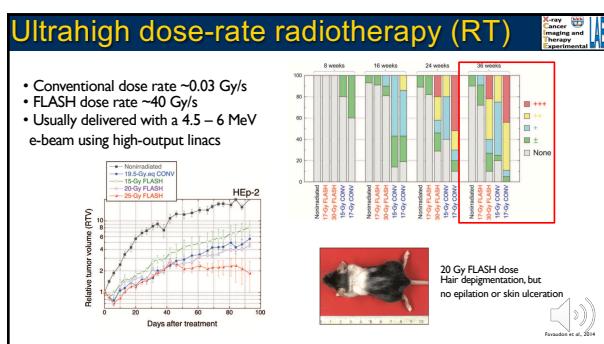
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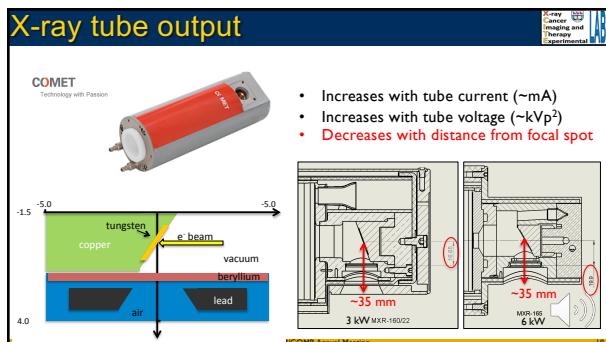


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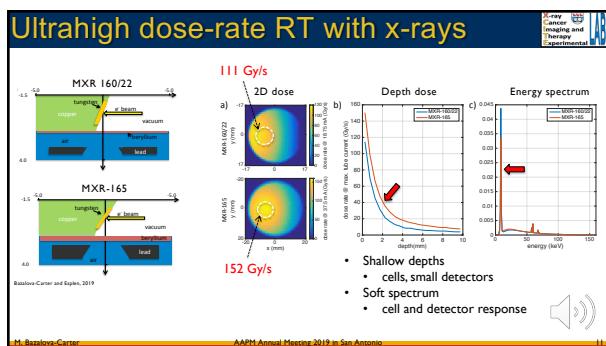
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X-ray tube output



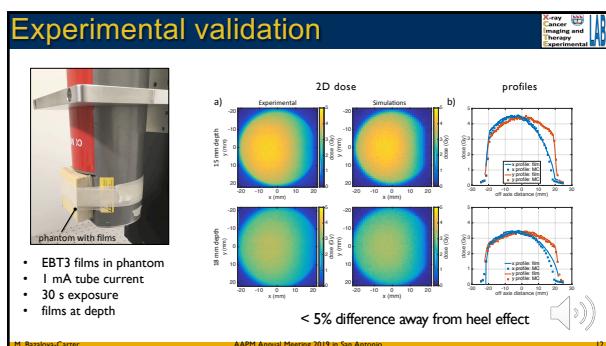
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Ultrahigh dose-rate RT with x-rays



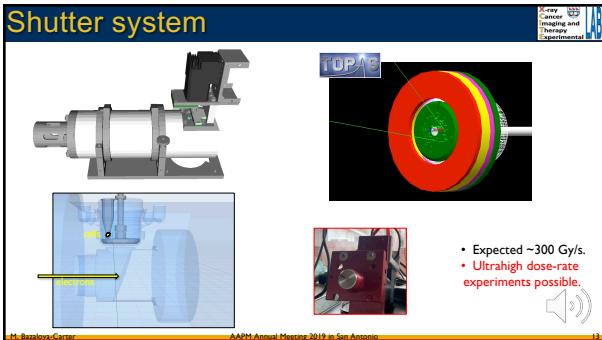
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Experimental validation



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Shutter system



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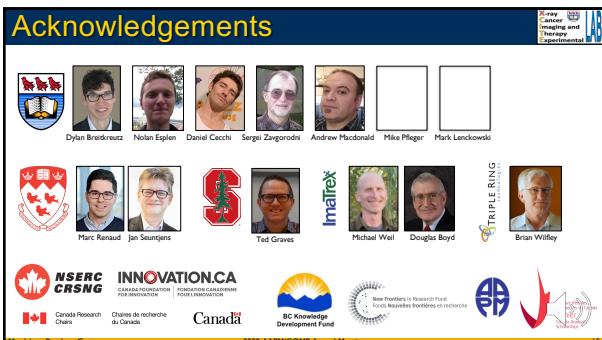
Conclusions

- Despite popular belief kilovoltage x-rays can go a long way (in radiation therapy)
- Radiation therapy with the kilovoltage x-ray arc therapy (KVAT) system might be possible
 - low dose spread out over a larger volume compared to VMAT
 - treatment times ~15 minutes per isocenter
- Ultrahigh-dose rate irradiations can be performed with conventional x-ray tubes
 - limited treatment depths
 - soft spectrum
 - can be pulsed with a shutter system
 - useful for dosimeter evaluation



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Acknowledgements



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