

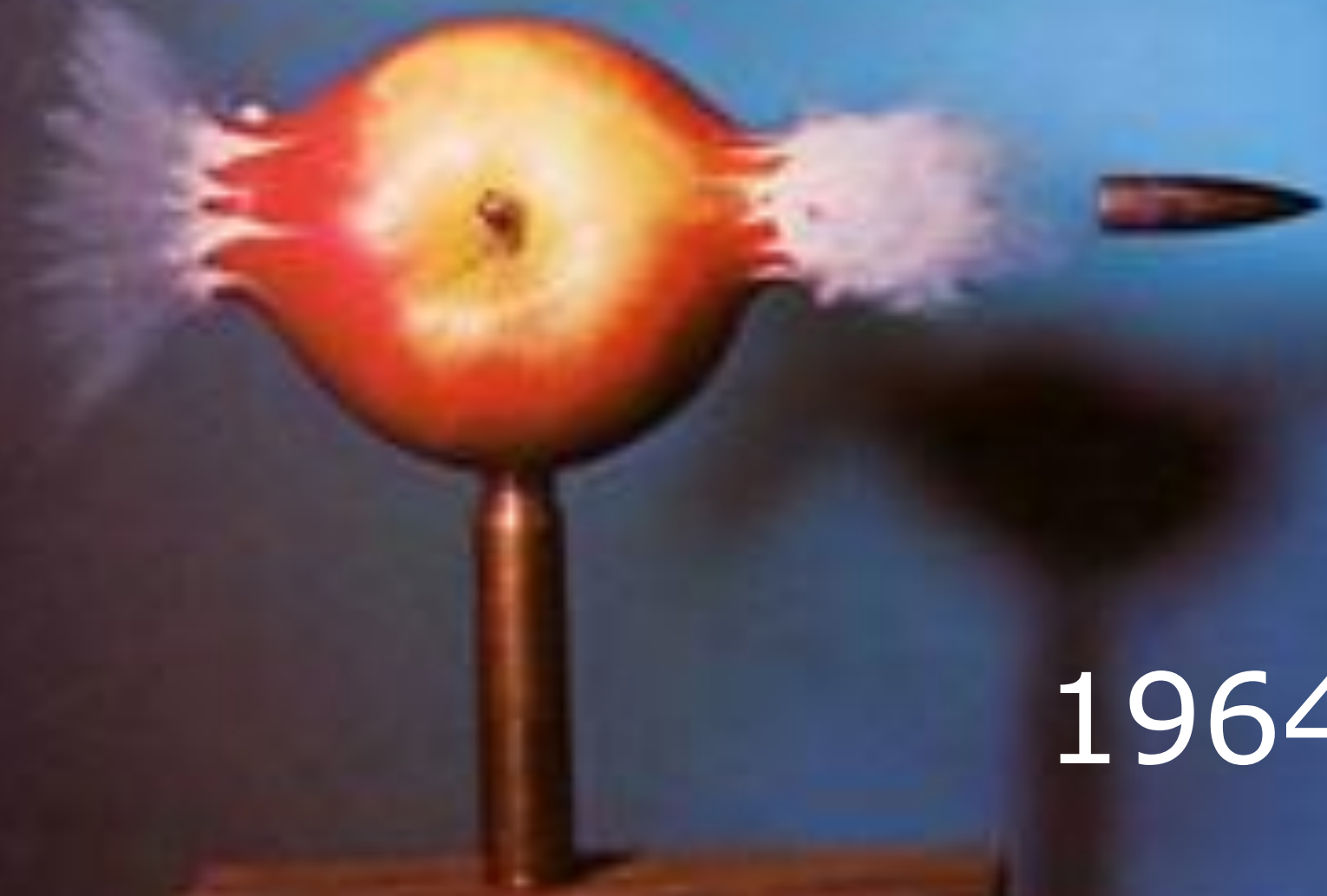


Femto-Photography

Ramesh Raskar
Associate Professor

MIT Media Lab

<http://raskar.info>



1964

Trillion Frames per Second

Femto-Photography

Light in Motion



Milli

Micro

Nano

Pico

Femto

Atto

Bullet of Light

1,000,000 x Faster

Milli

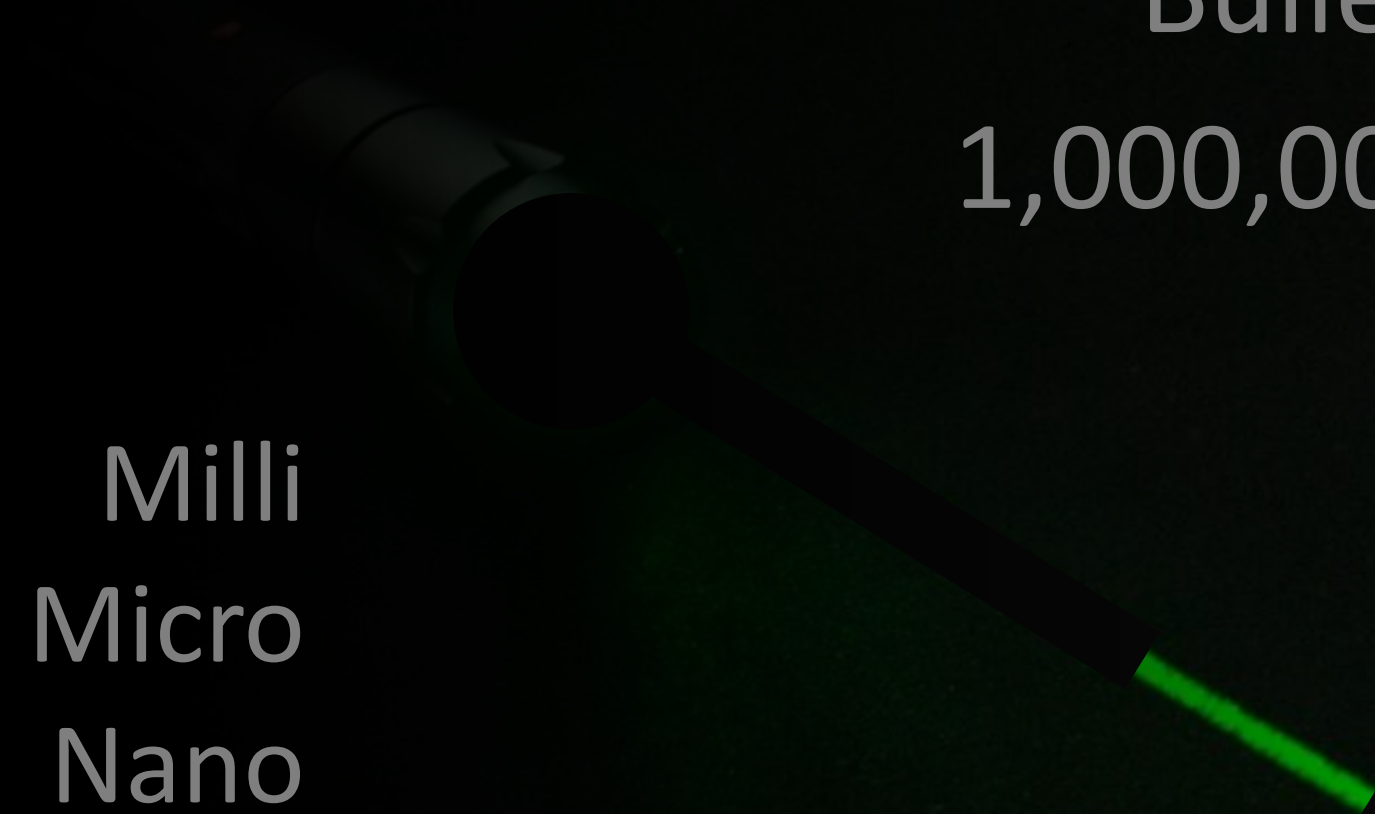
Micro

Nano

Pico

Femto

Atto



Light in Slow Motion ..



10 Billion x Slow

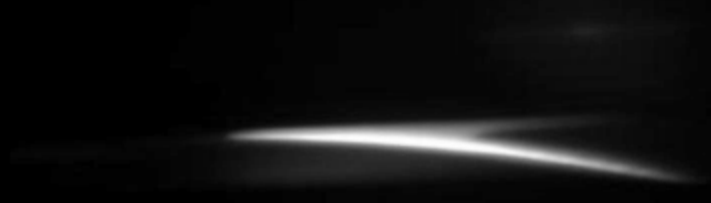
Trillion frames per second





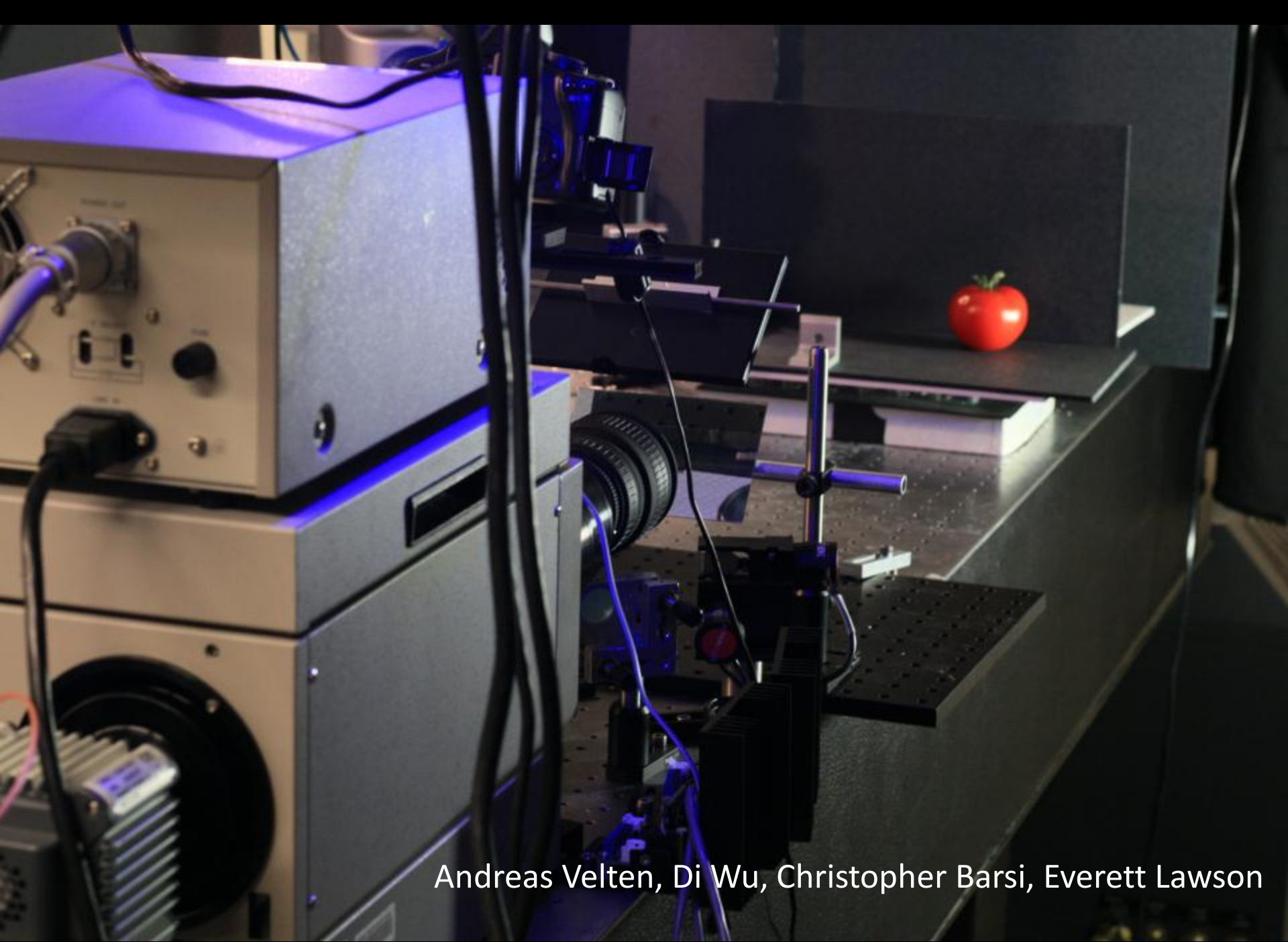
Painting a Photo In Time





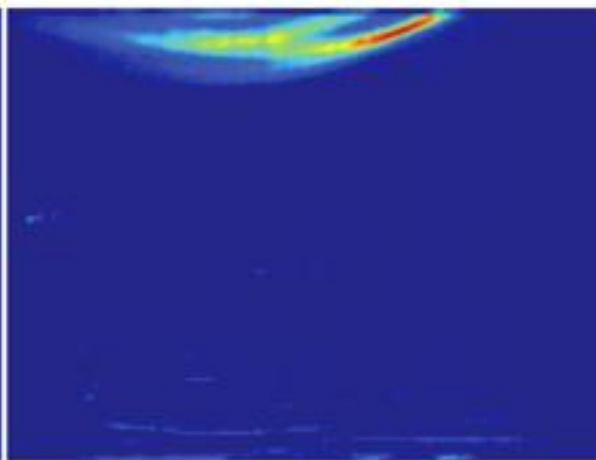
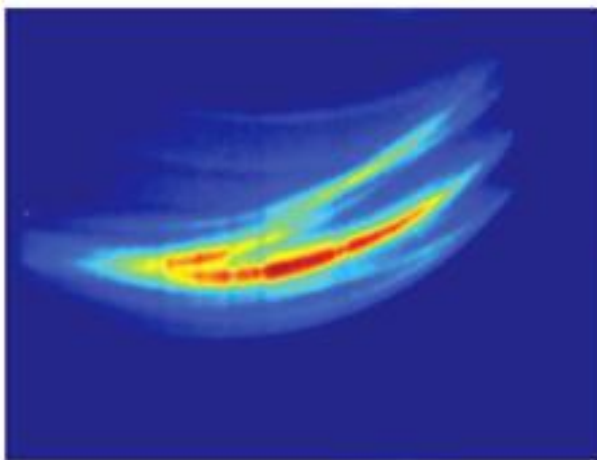
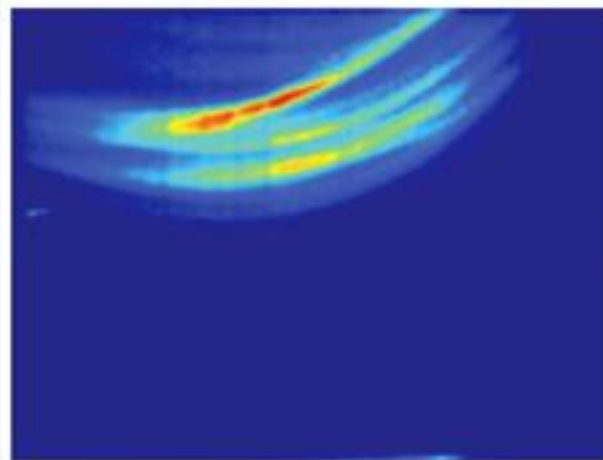
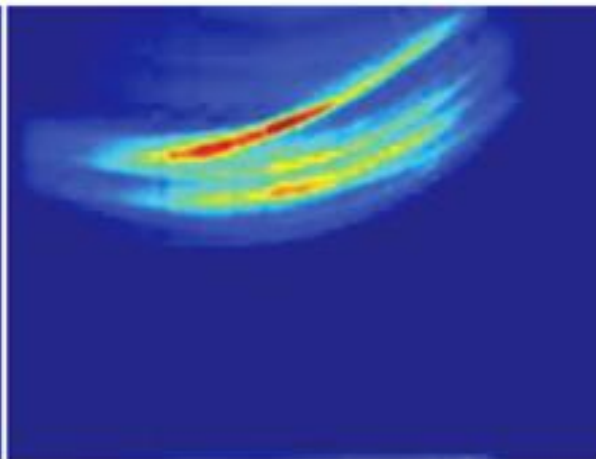
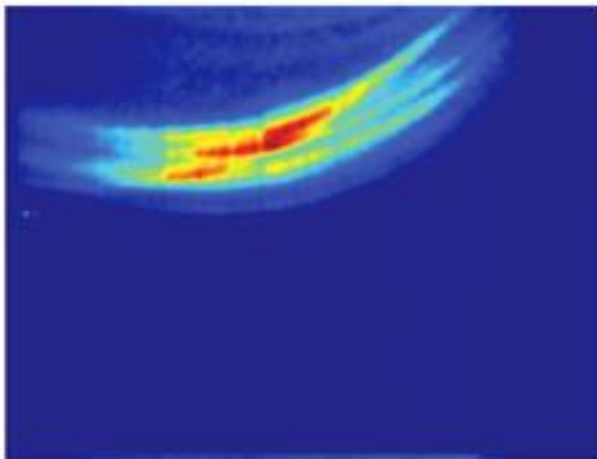
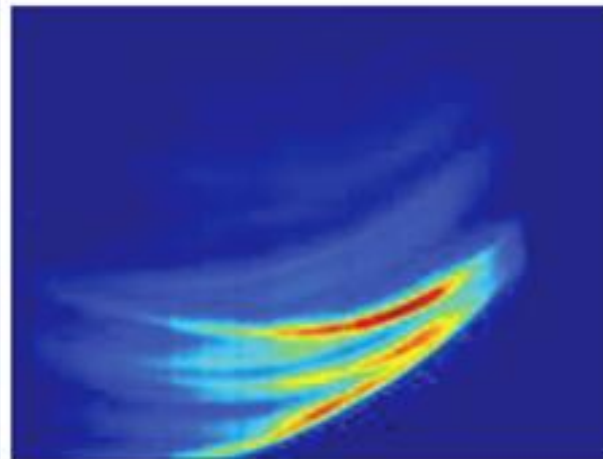
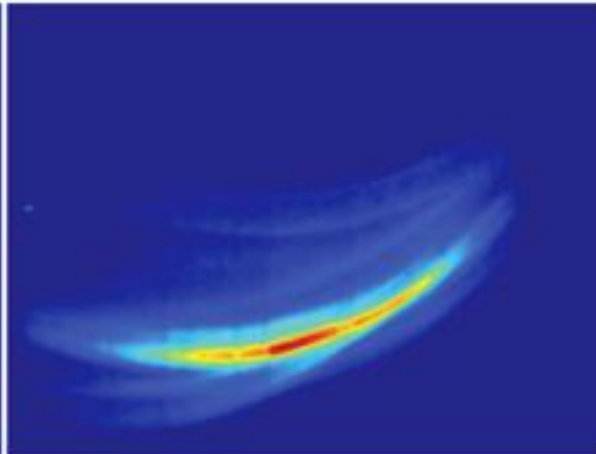
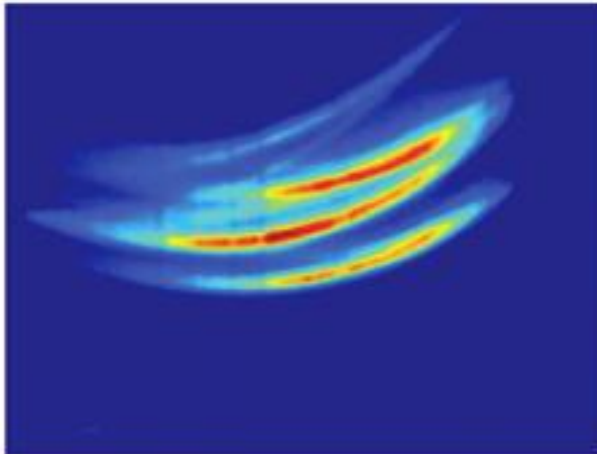
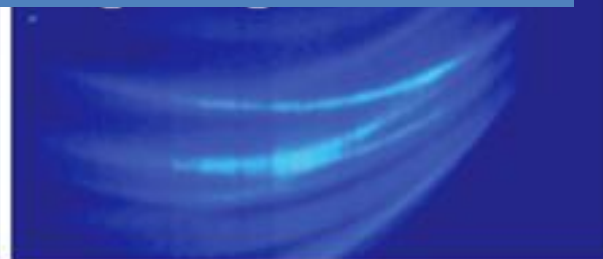
Ripe ?

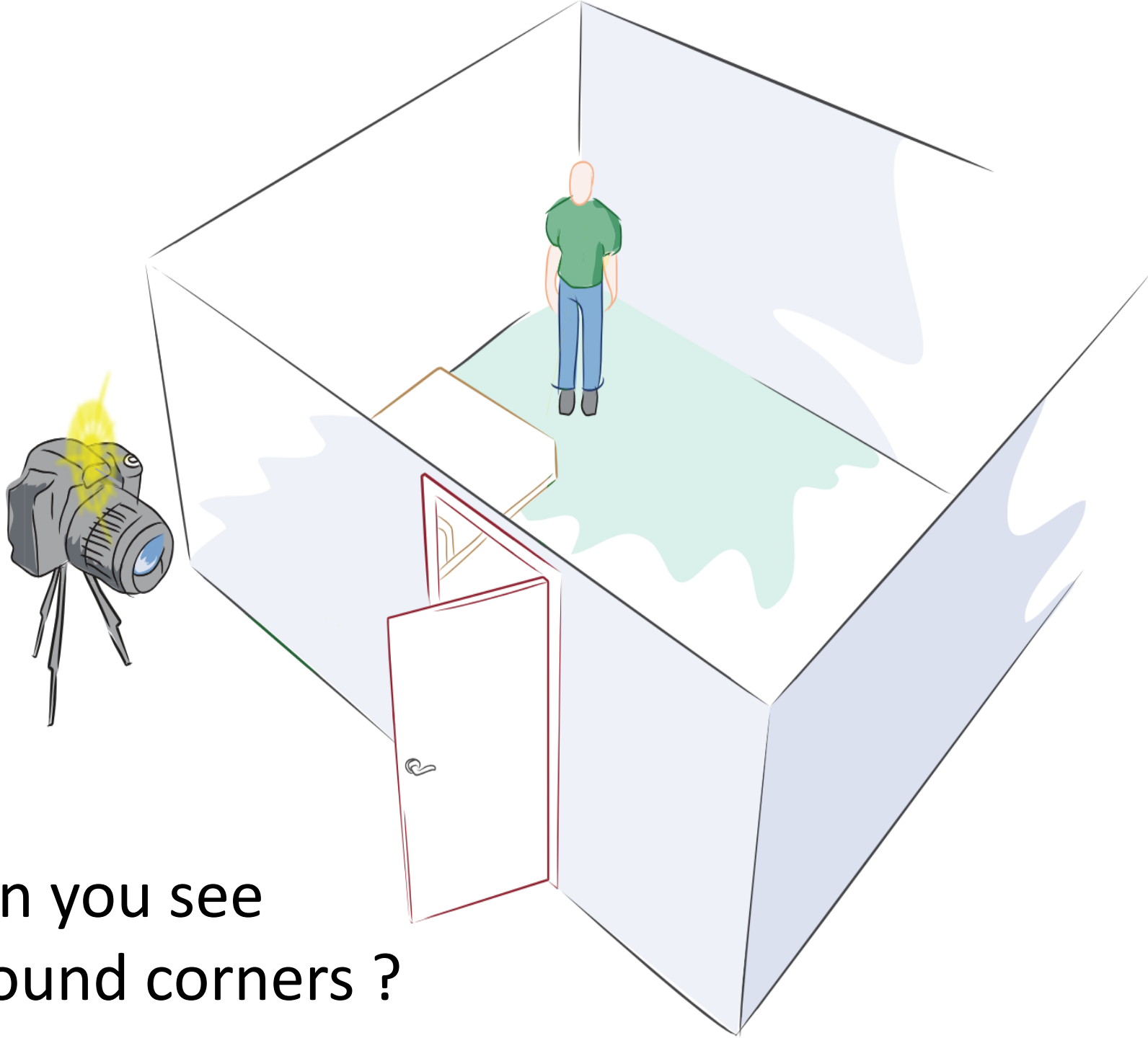




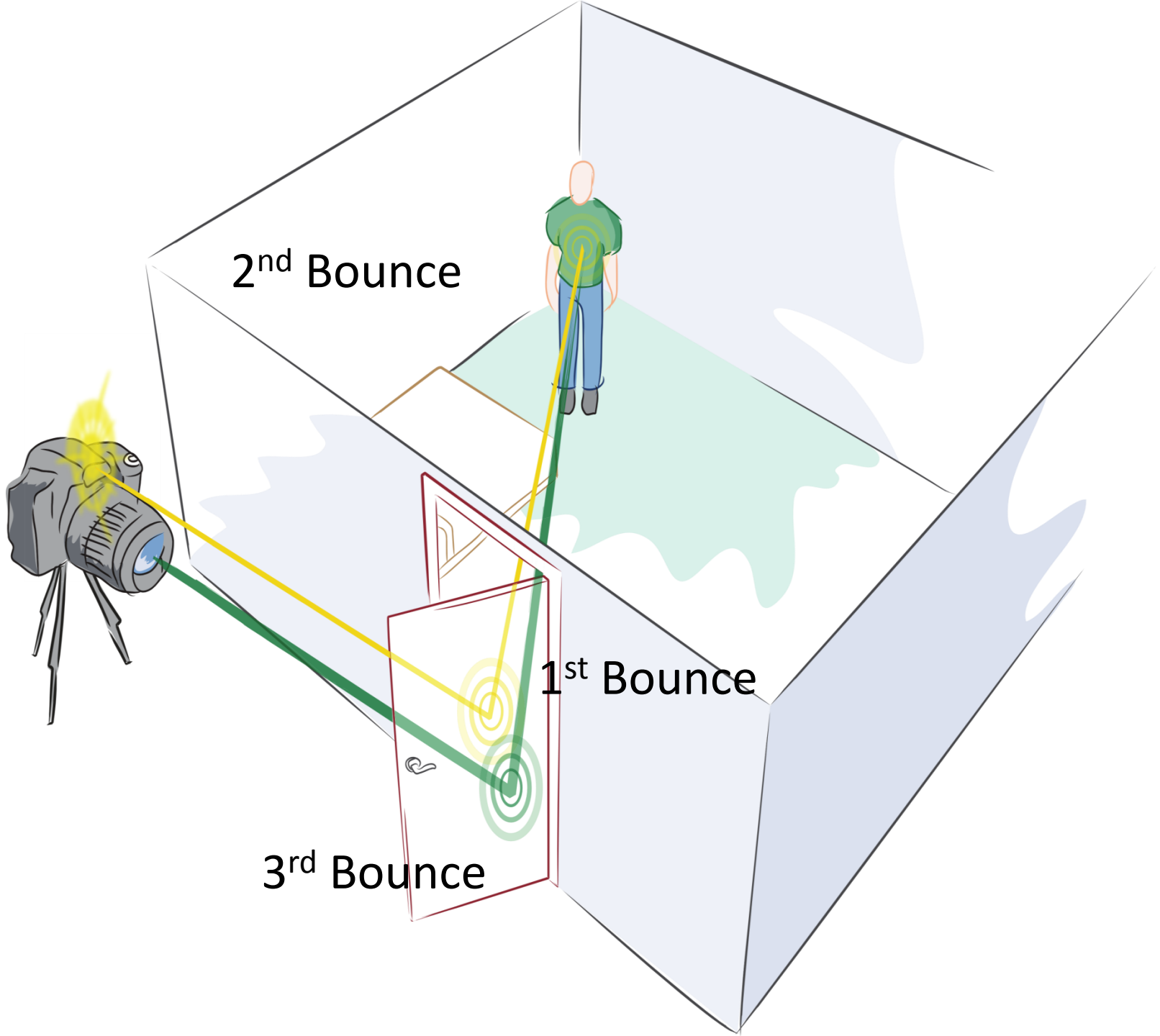
Andreas Velten, Di Wu, Christopher Barsi, Everett Lawson

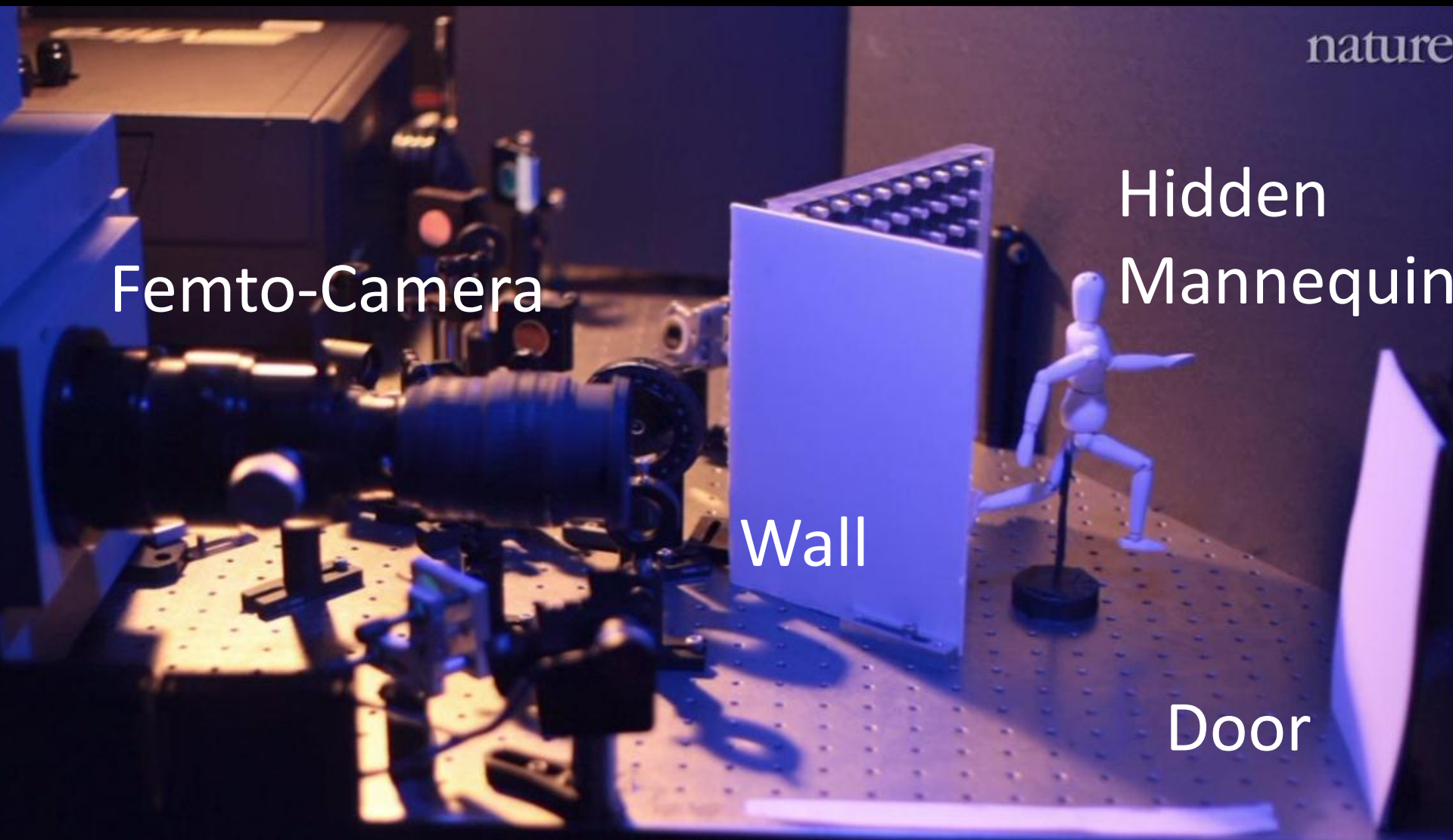
Raw Data





Can you see
around corners ?





nature

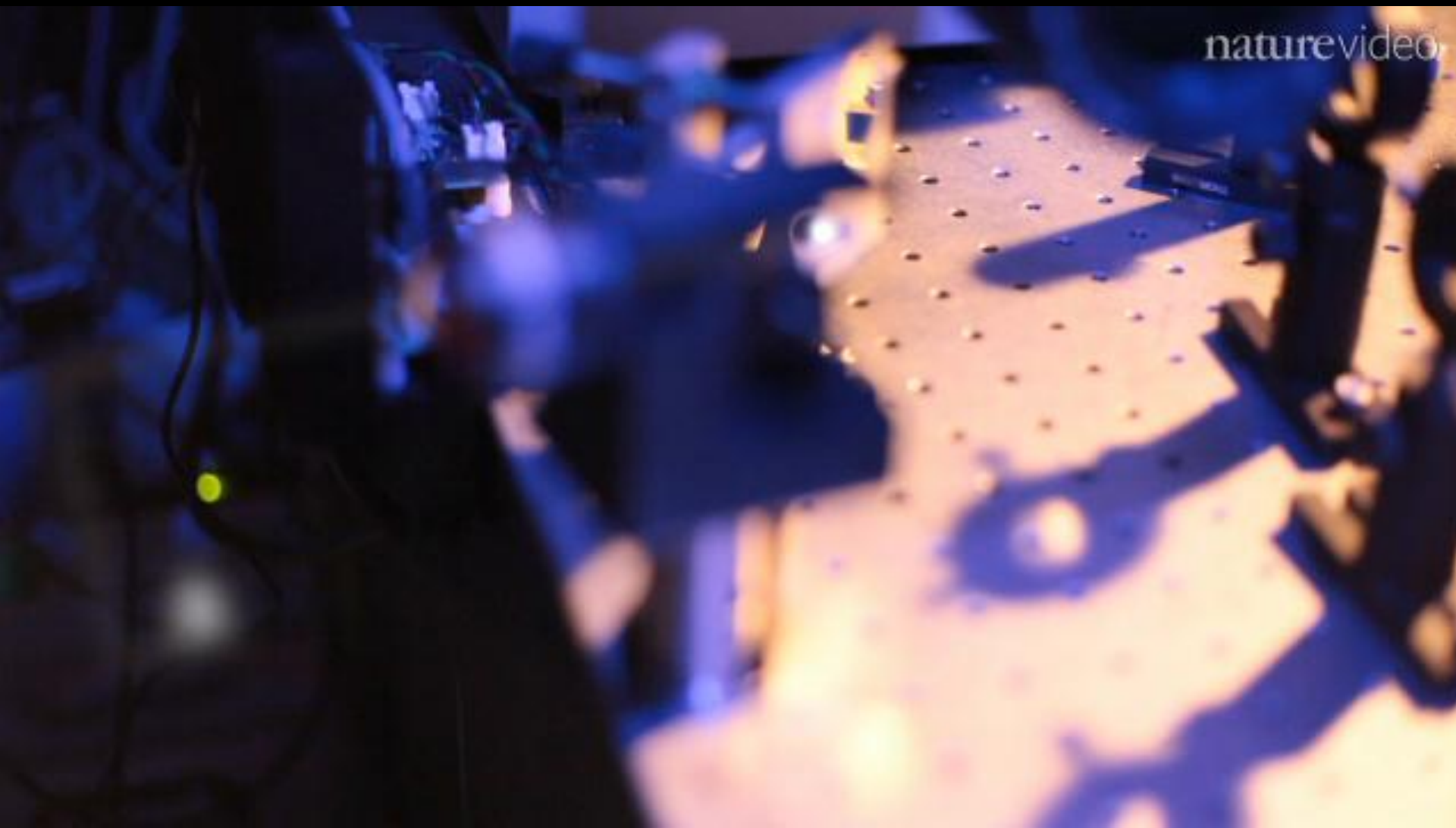
Hidden
Mannequin

Femto-Camera

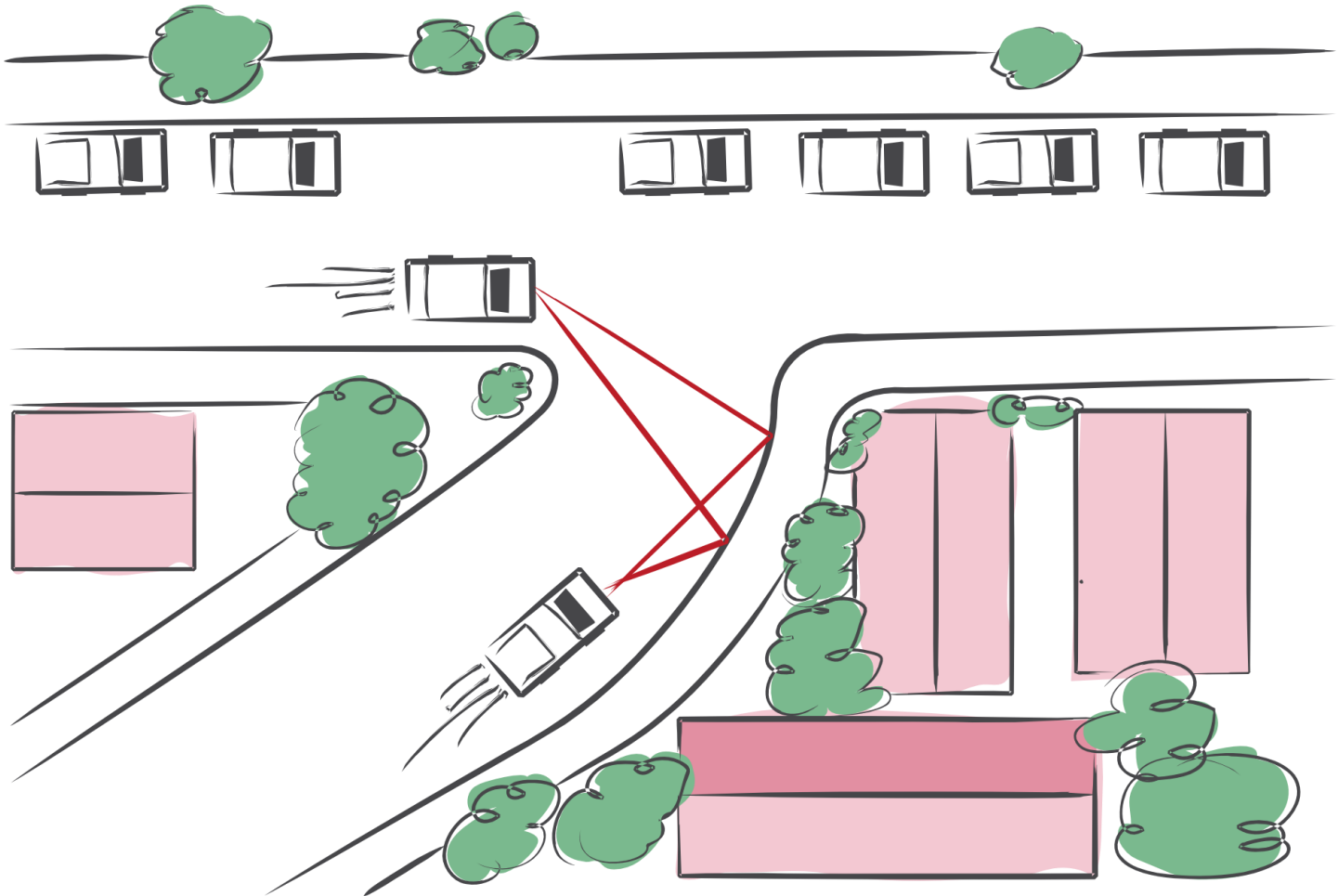
Wall

Door

Velten et al, **Nature Communications** 2012

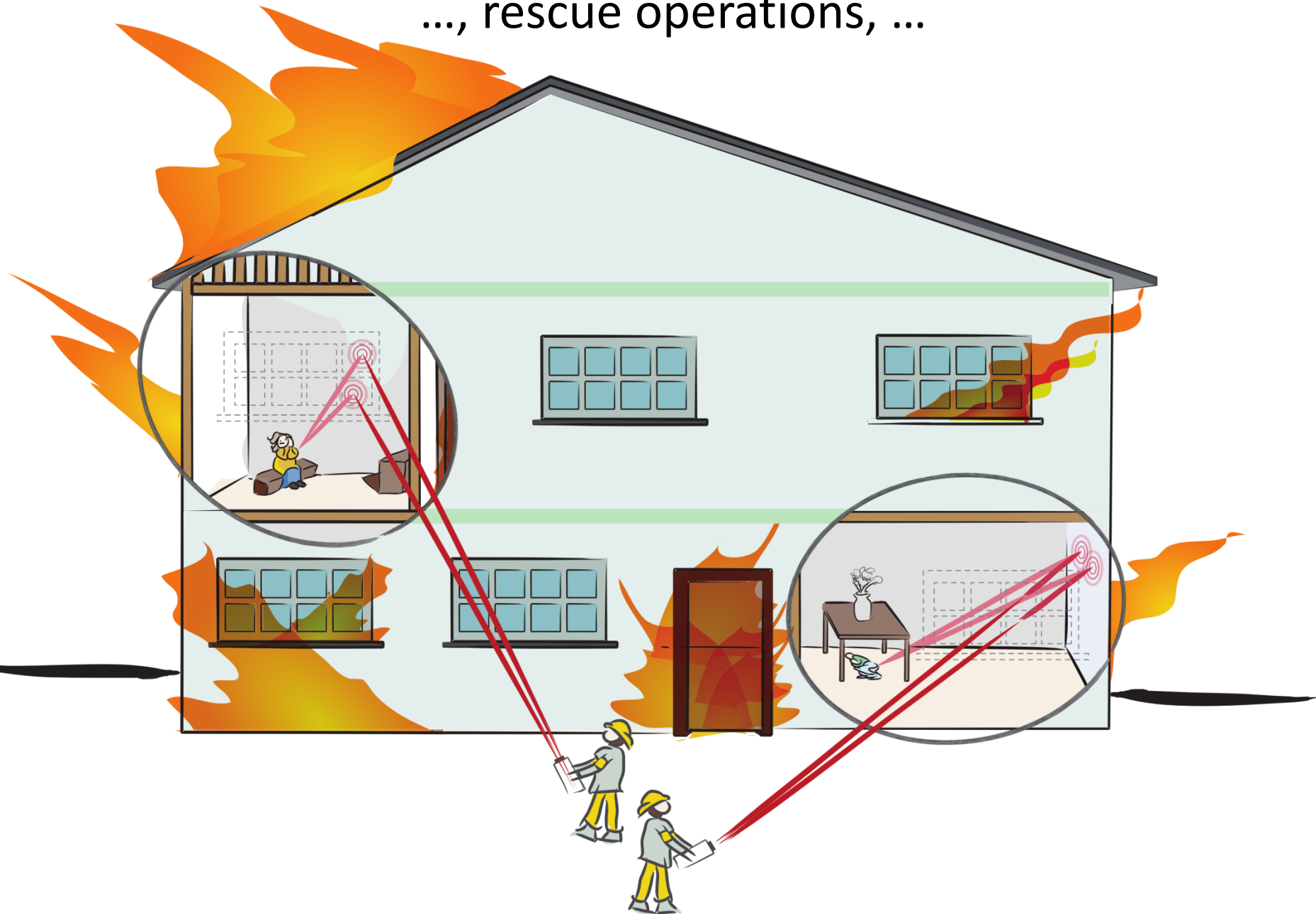


Avoiding Collisions

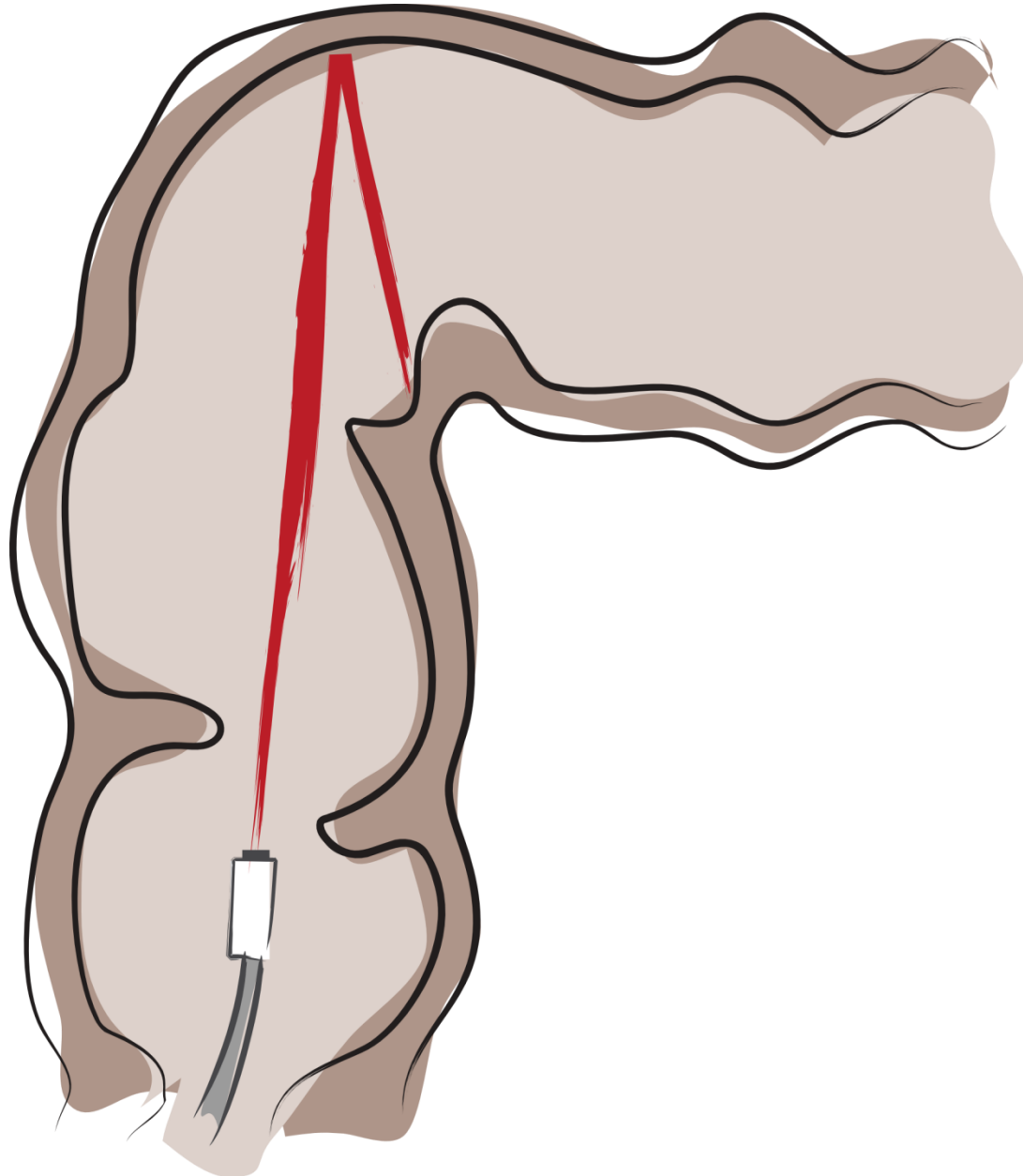


Andreas Velten, Thomas Willwacher, Otkrist Gupta, Ashok Veeraraghavan,
Moungi Bawendi, Ramesh Raskar, Nature Communications 2012

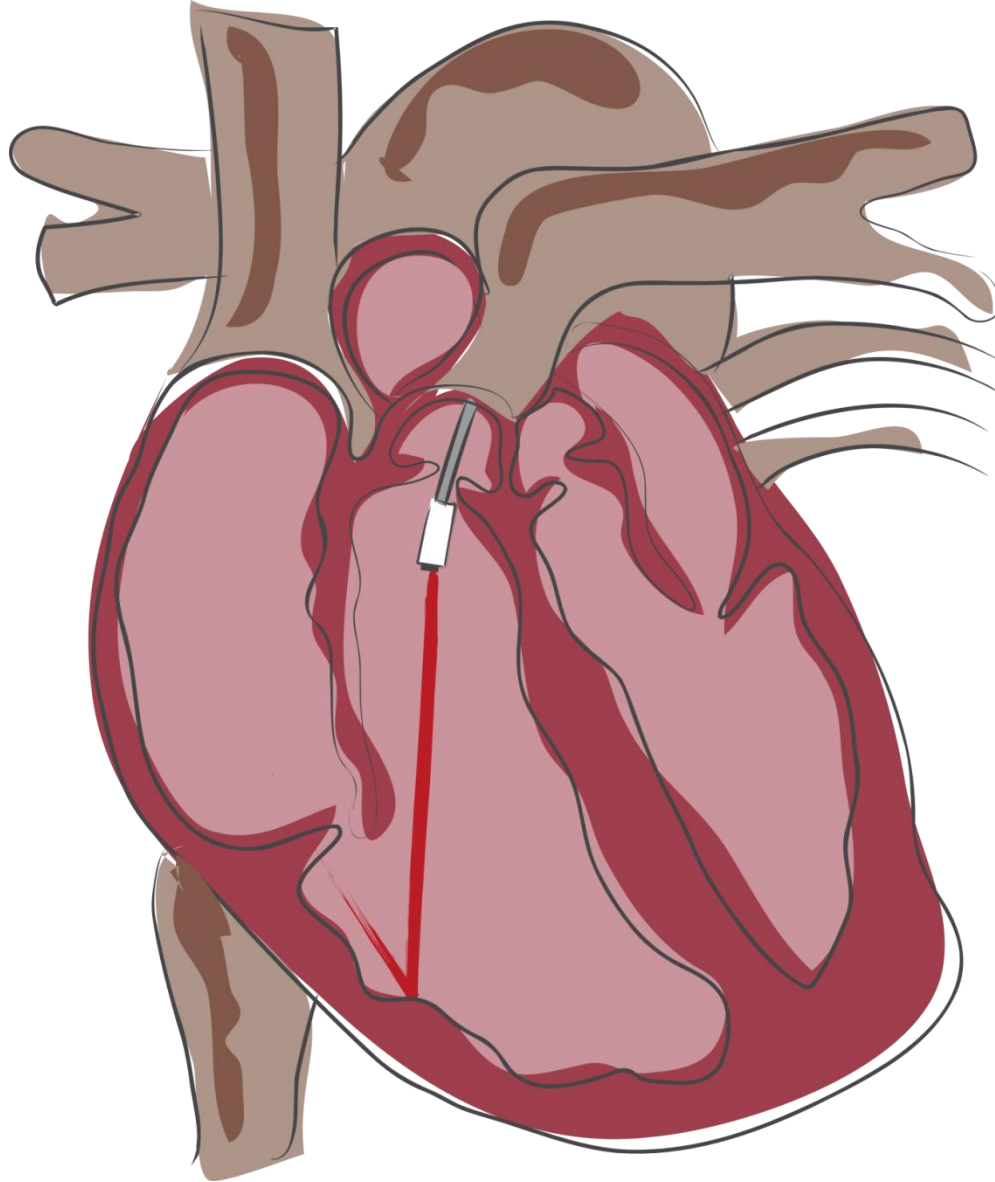
..., rescue operations, ...

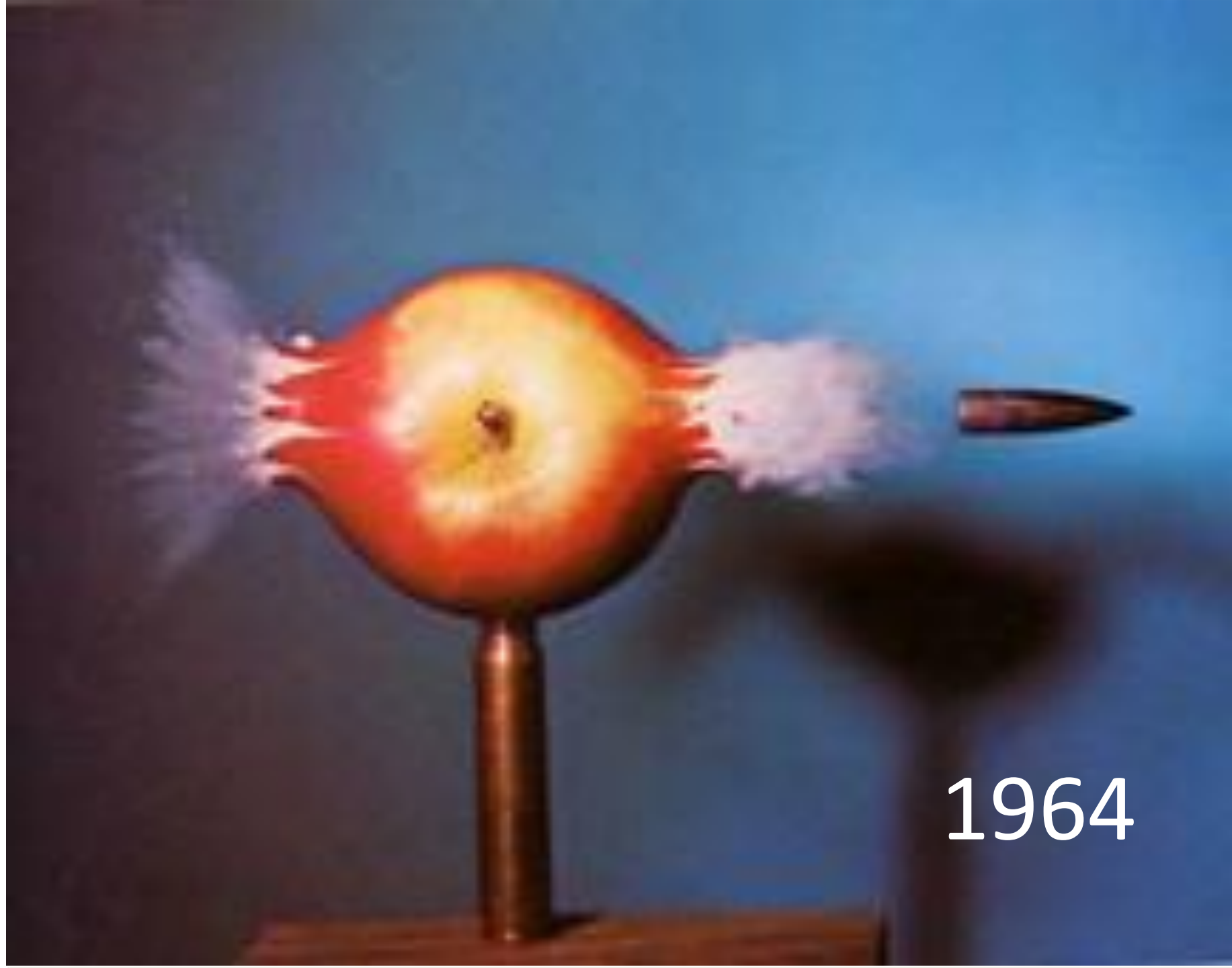


..., colonoscopies, ...



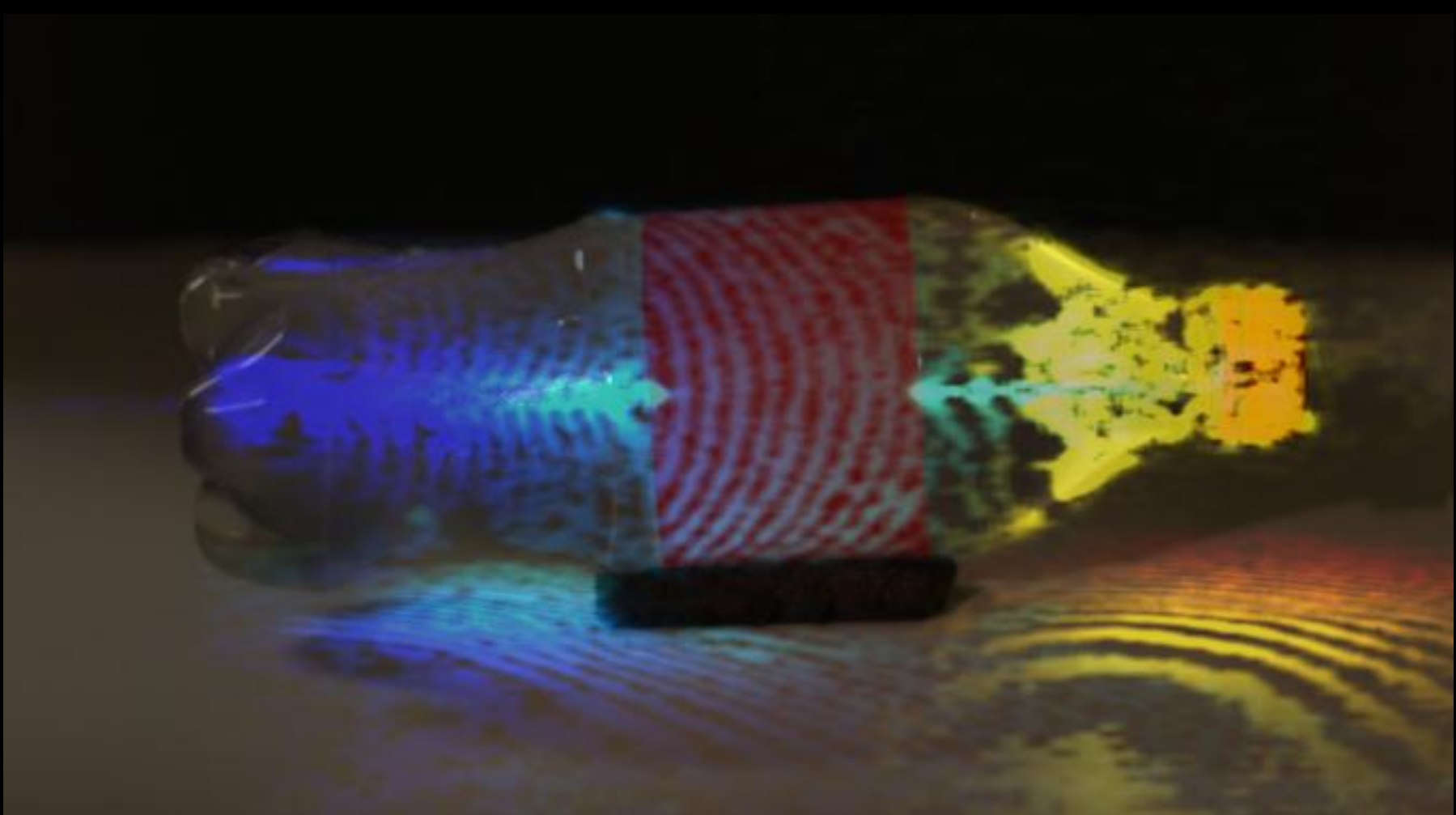
..., cardioscopies, ...



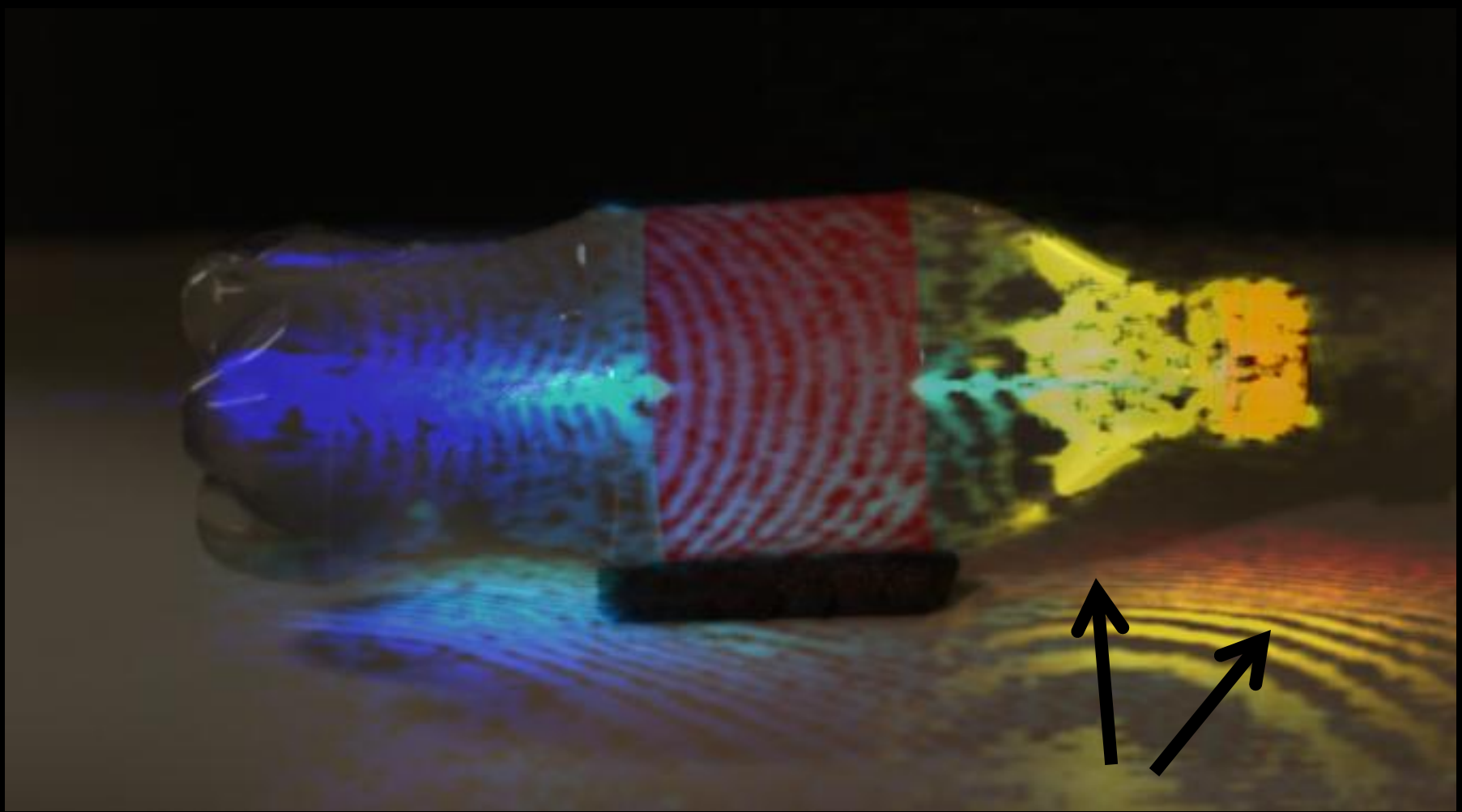


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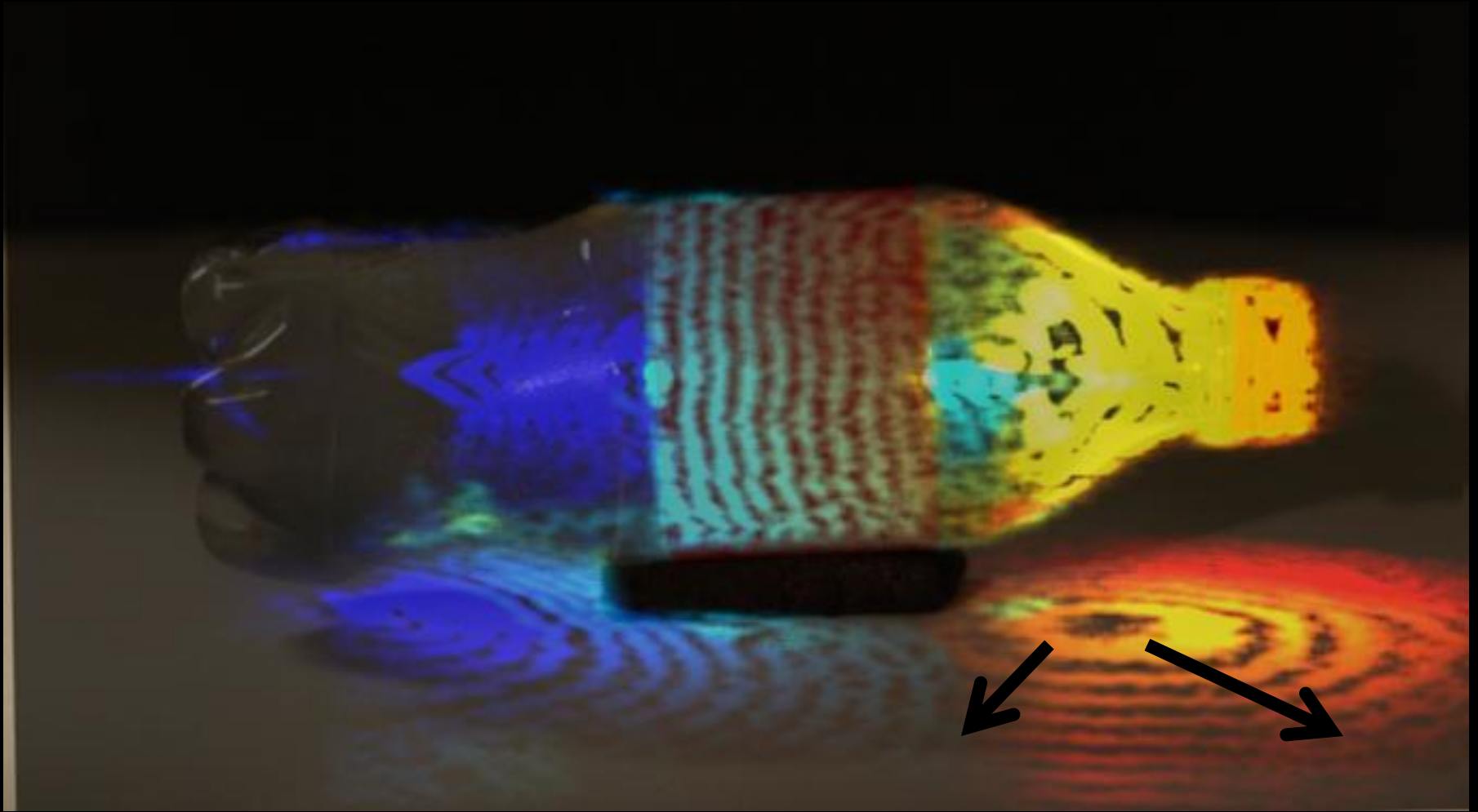
Computational Photography

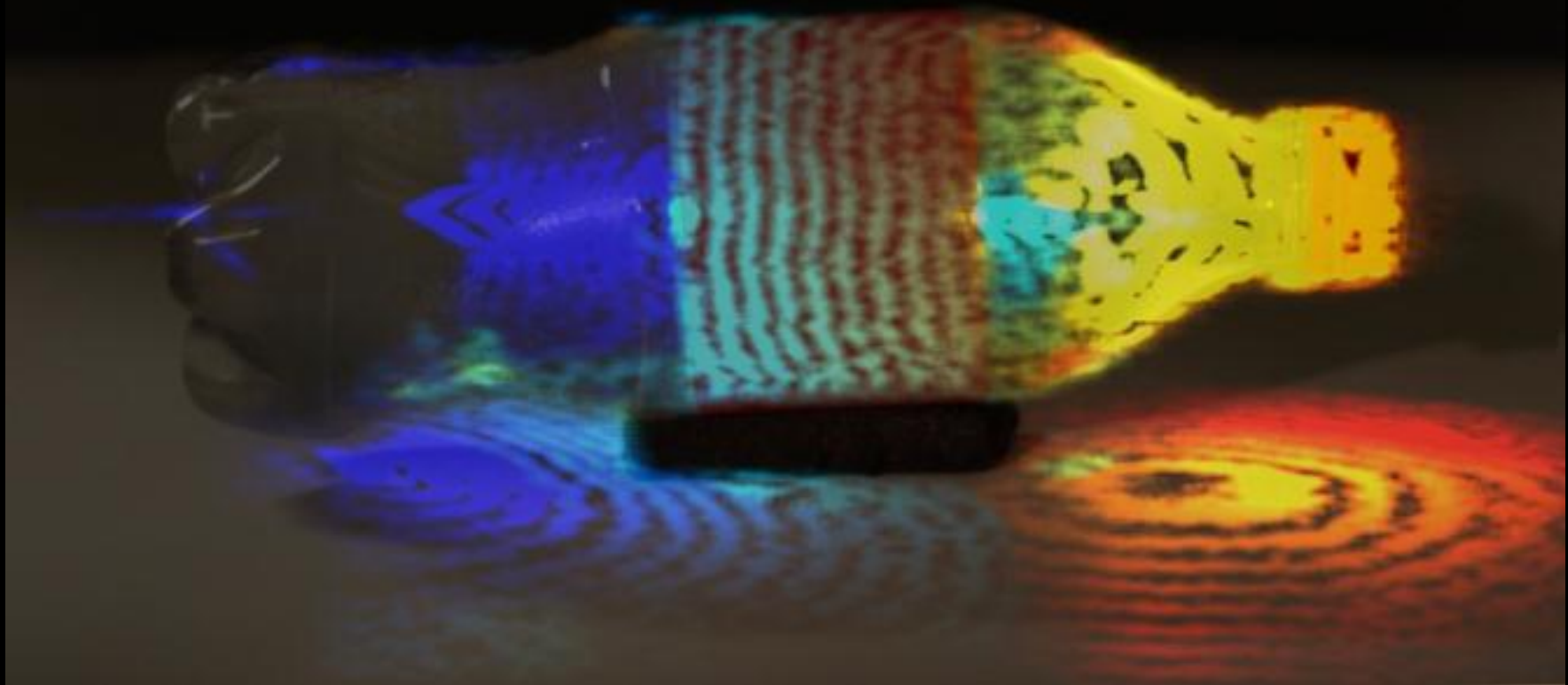


Ripples of Waves



Time Distortion ~ Speed of Light





END

