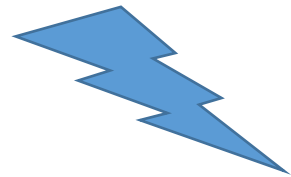


CMOS sensors as beam monitors

Sarah Busef, Ivan Caicedo, Francesco Piro, Lluís Simón

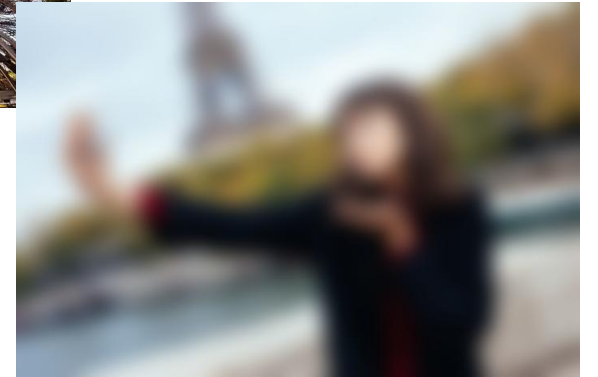
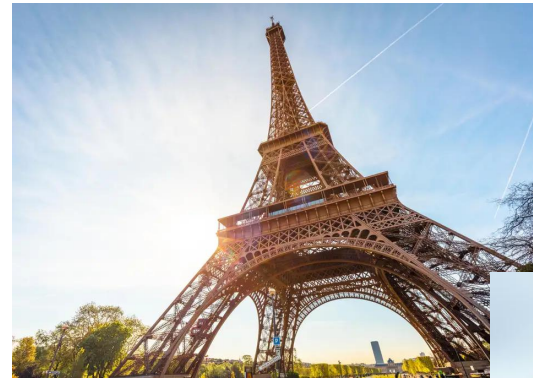


CMOSnitors

Think of you going to a trip, and wanting to tell everybody...

Will they believe you without a photo?

- If you have one, would it work:
 - without you on it?
 - blurry?



Nicer this way, right?



PS. Radiologists want something similar when they treat cancer patients ;)

What kind of things do they want?

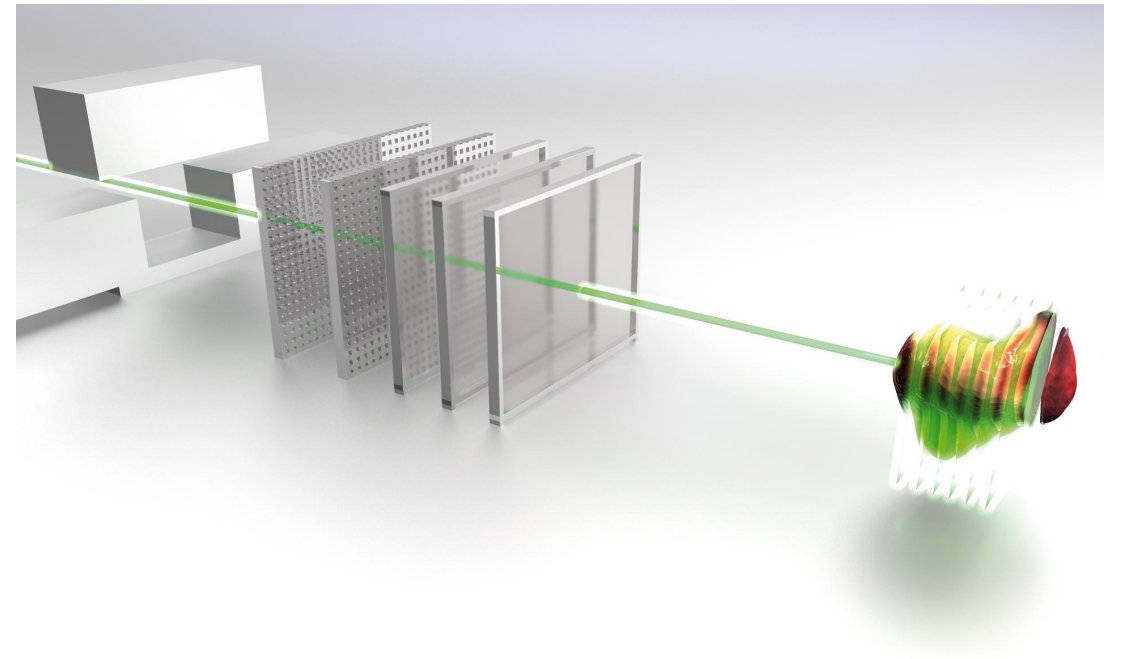
- Better beam focalisation
- Faster treatment time
- Get to know the treatment dose

Medical accelerator beams require:

Real time (Take a photo!)

monitoring of intensity (Check that it is there!)

and beam profile (Hopefully where it's clear how it looks, so that you don't treat the wrong region!)



Current players

Mostly “hand-crafted”, real-time but mostly focused on intensity of the beam.
(Ref. “Beam monitor detectors for medical applications”, K. Nesteruk, 2014)

- **Secondary monitors:** Indirect measurement ---> No information on beam profile.
- **In-beam monitors:** Direct measurement ---> Beam profile with bad resolution + Electronics have to deal with radiation damage.

CMOS sensors

- Reliable commercial technology
 - Real-time operation
- Radiation-hard (It can be placed in-beam!)
 - High resolution