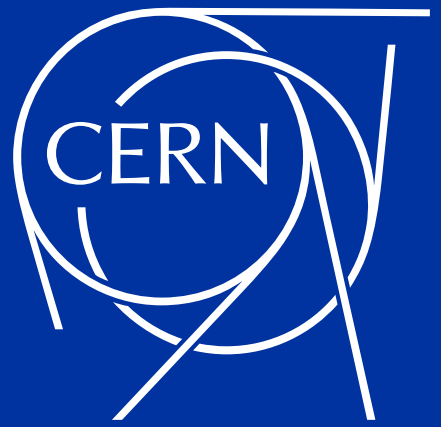
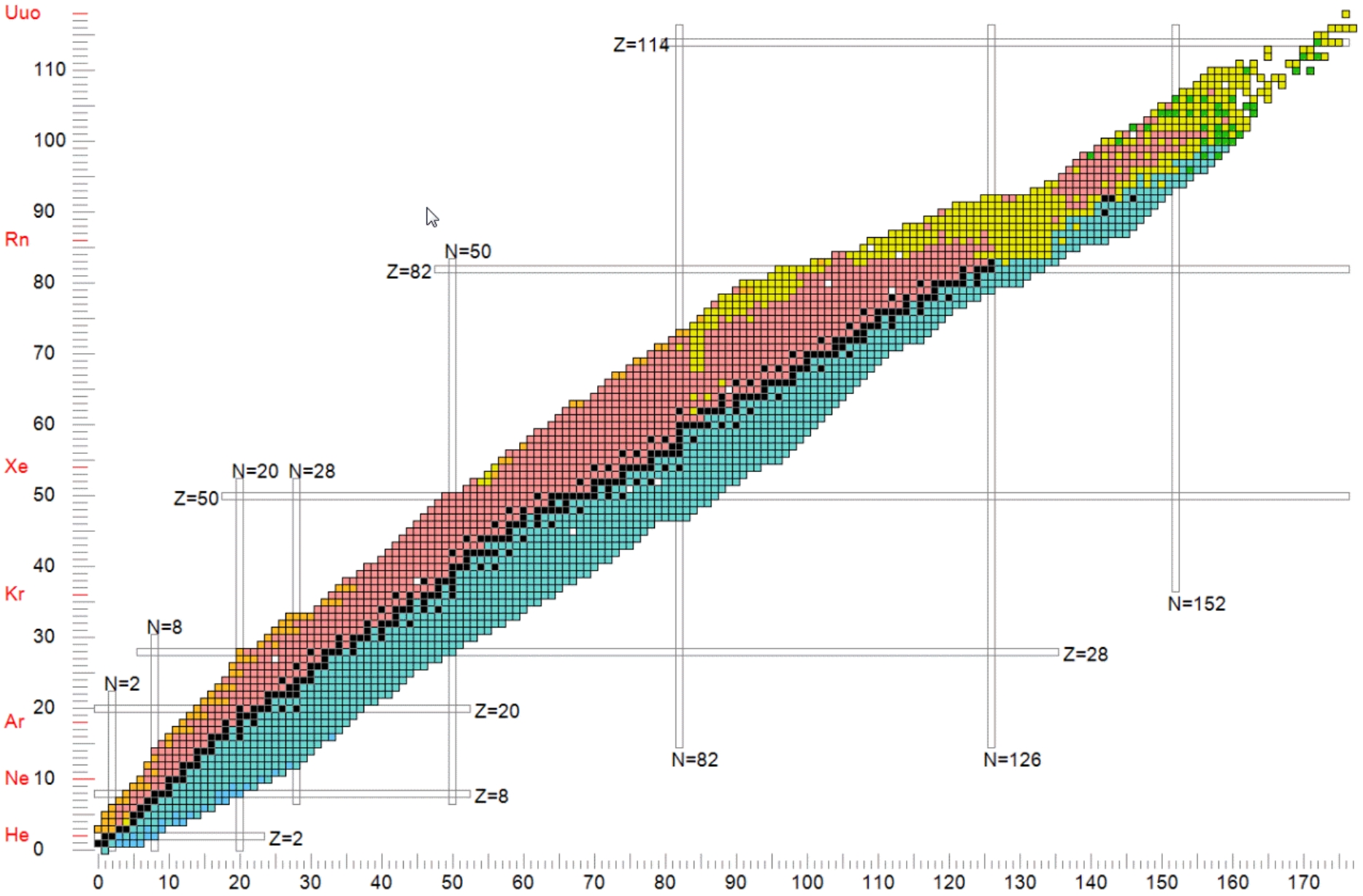


Radiation protection for Beamline for Schools

Markus Widorski, HSE-RP

23 September 2022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160
170

Radiation protection - Basics

Ionising radiation may be harmful to human bodies

Radiation protection aims to protect humans against negative impact from ionising radiation.

Radiation protection principles:

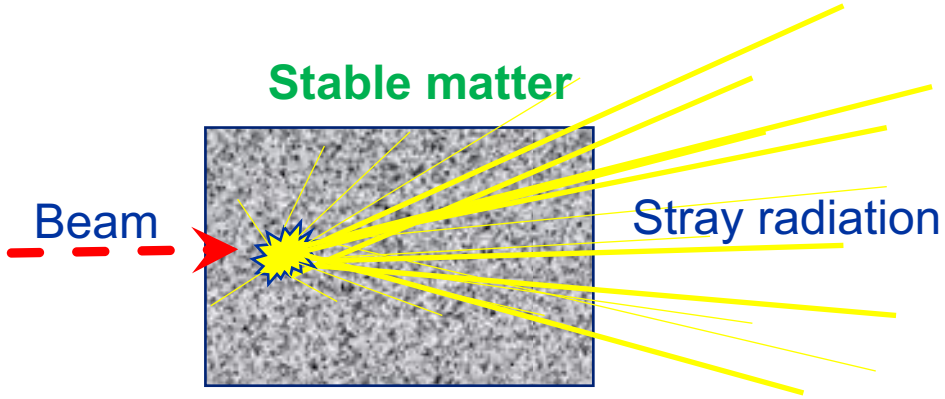
Justification – Limitation – Optimisation

Radiation at CERN

Accelerator operating

The interaction of the beam with matter generates stray radiation

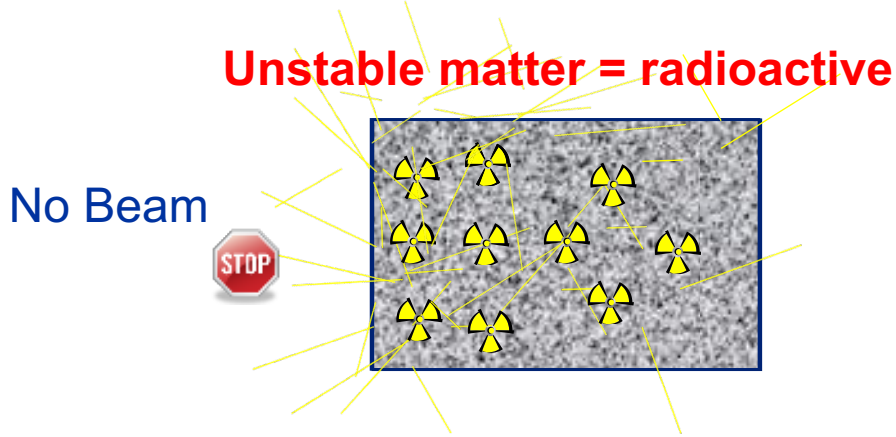
Stray radiation



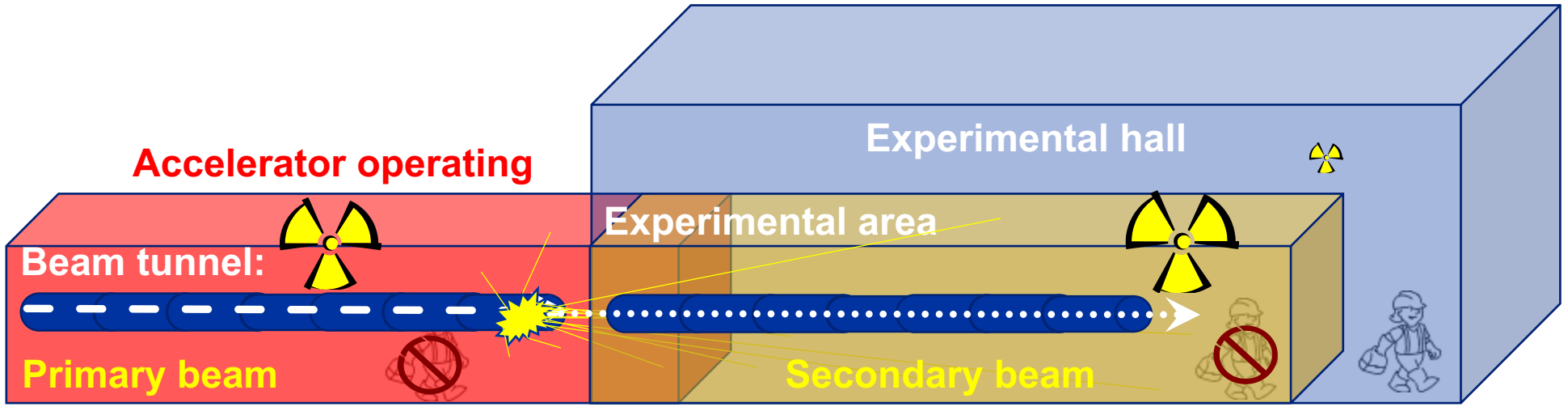
Accelerator stopped

The interaction of the beam with matter has produced radioactivity (activation)

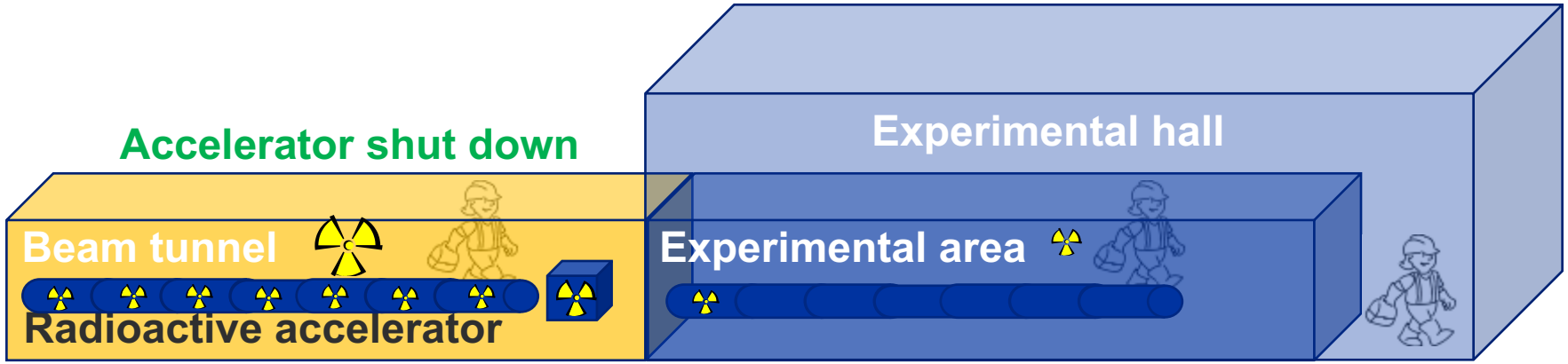
Residual radioactivity



Ionising radiation in and around accelerators



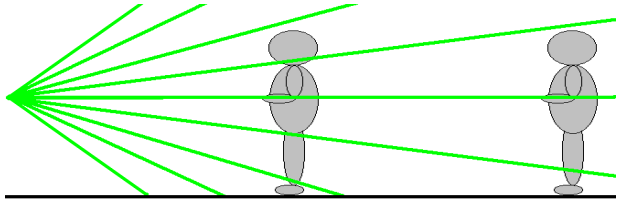
Ionising radiation in and around accelerators



Radiation protection - How to protect yourself

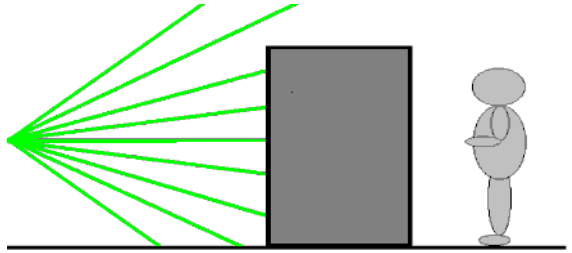
TIME

If you **reduce** the exposure time, you reduce the dose.



DISTANCE

The further you **move away** from the source, the less the radiation you will receive.



SHIELDING

Adequate **shielding** will reduce the dose received. Specific material is necessary against each type of radiation. Concrete is effective against all types. Lead is very effective against low energy gamma radiation.

Radiation Areas at CERN

Areas with increased risk of ionizing radiation are classified as "Radiation Areas".

Radiation Areas at CERN are clearly marked with signs. Corresponding to the risk level, Radiation Areas are subdivided into:

	Supervised Area	Simple Controlled Area	Limited Stay Controlled Area	High Radiation Controlled Area	Prohibited Controlled Area
RADIATION					
RADIATION / CONTAMINATION					

The East Experimental Area is classified as Supervised Radiation Area

Radiation Protection – General rules

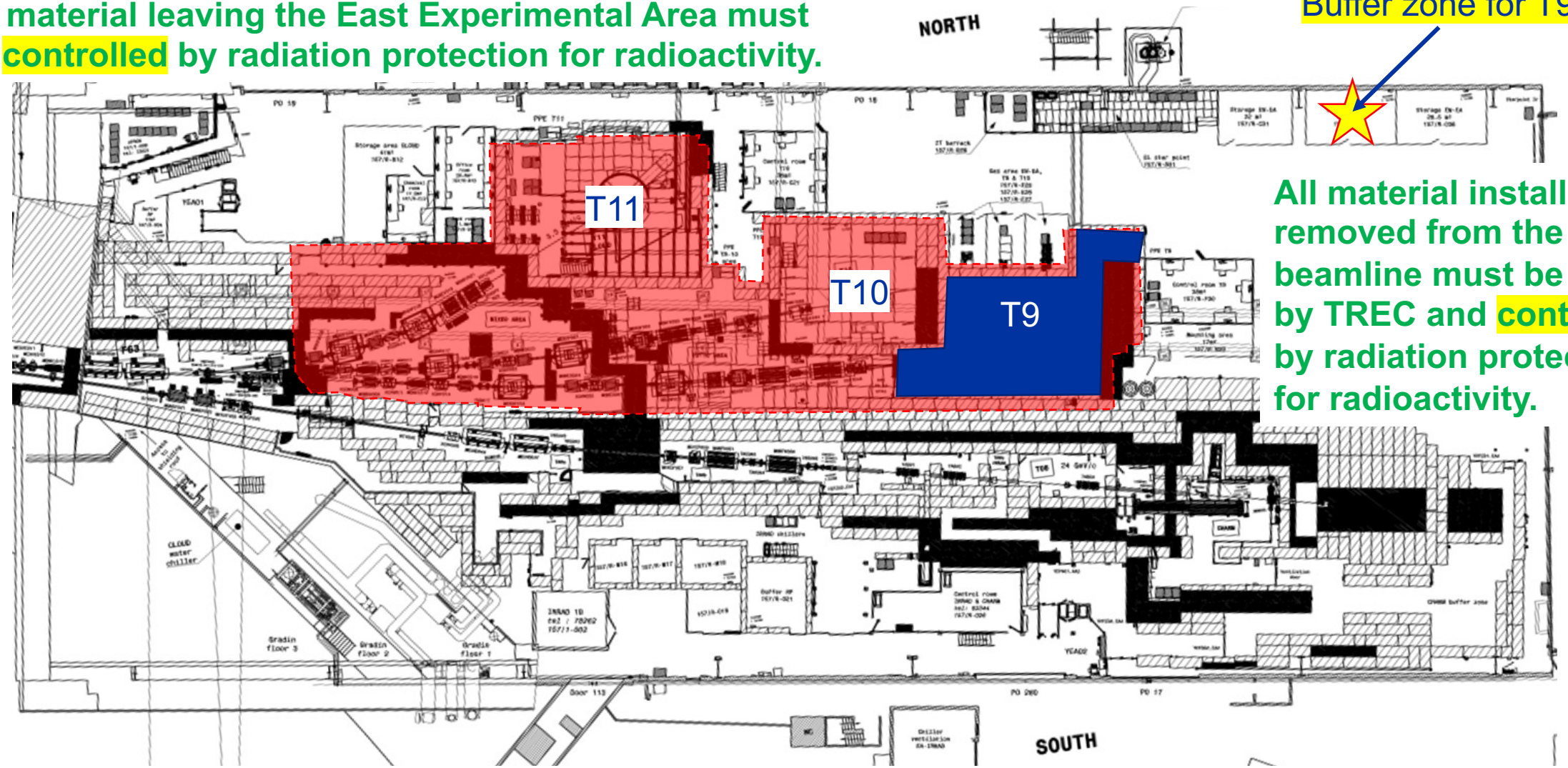
Do not perform activities which are not directly relevant to the work

In a Radiation Area it is forbidden to drink, eat or smoke.

Respect delimitations, markings and information given on signs

Secondary beam lines T9, T10 & T11

All material leaving the East Experimental Area must be controlled by radiation protection for radioactivity.



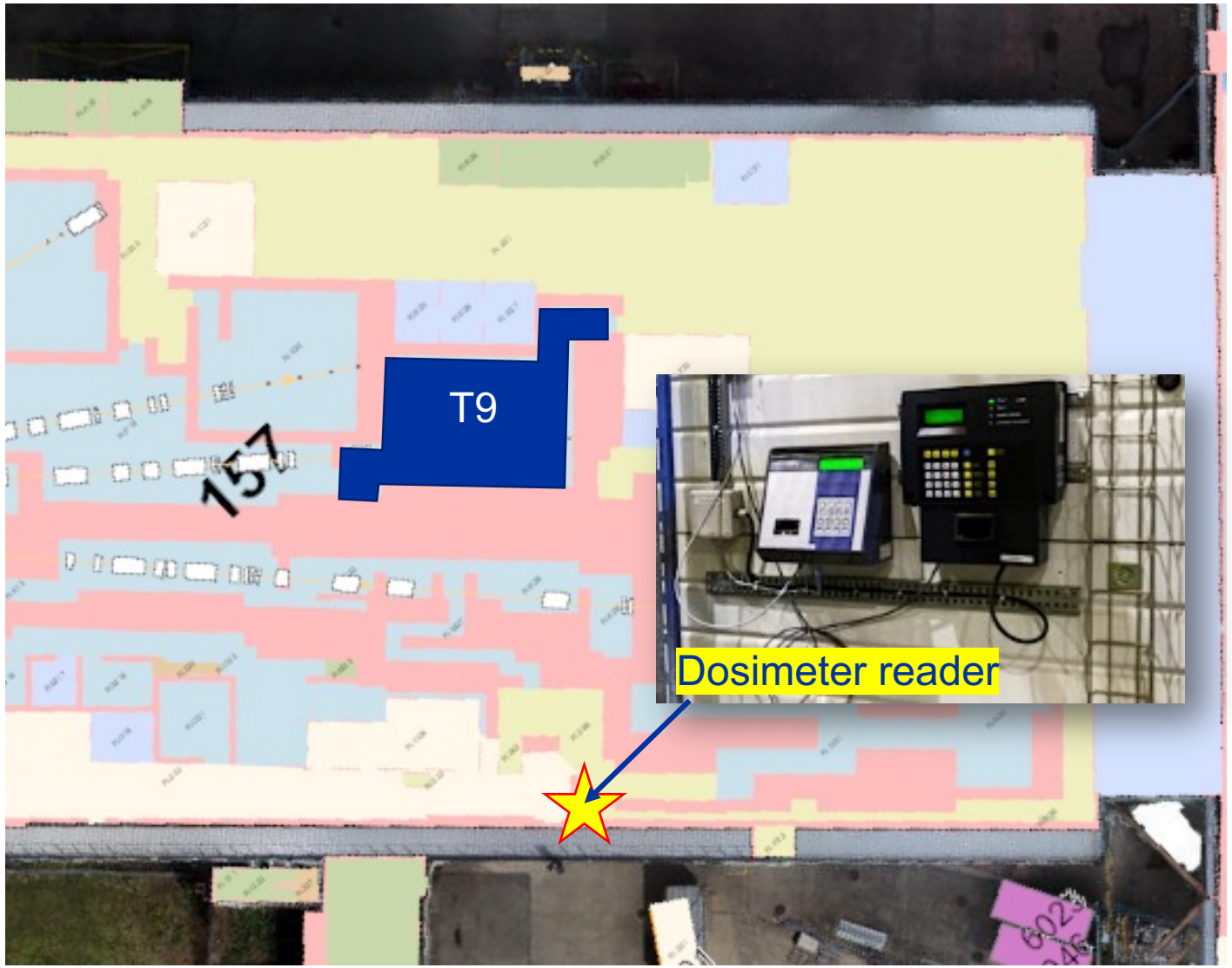
All material installed and removed from the beamline must be traced by TREC and controlled by radiation protection for radioactivity.

CERN Personal Dosimeter

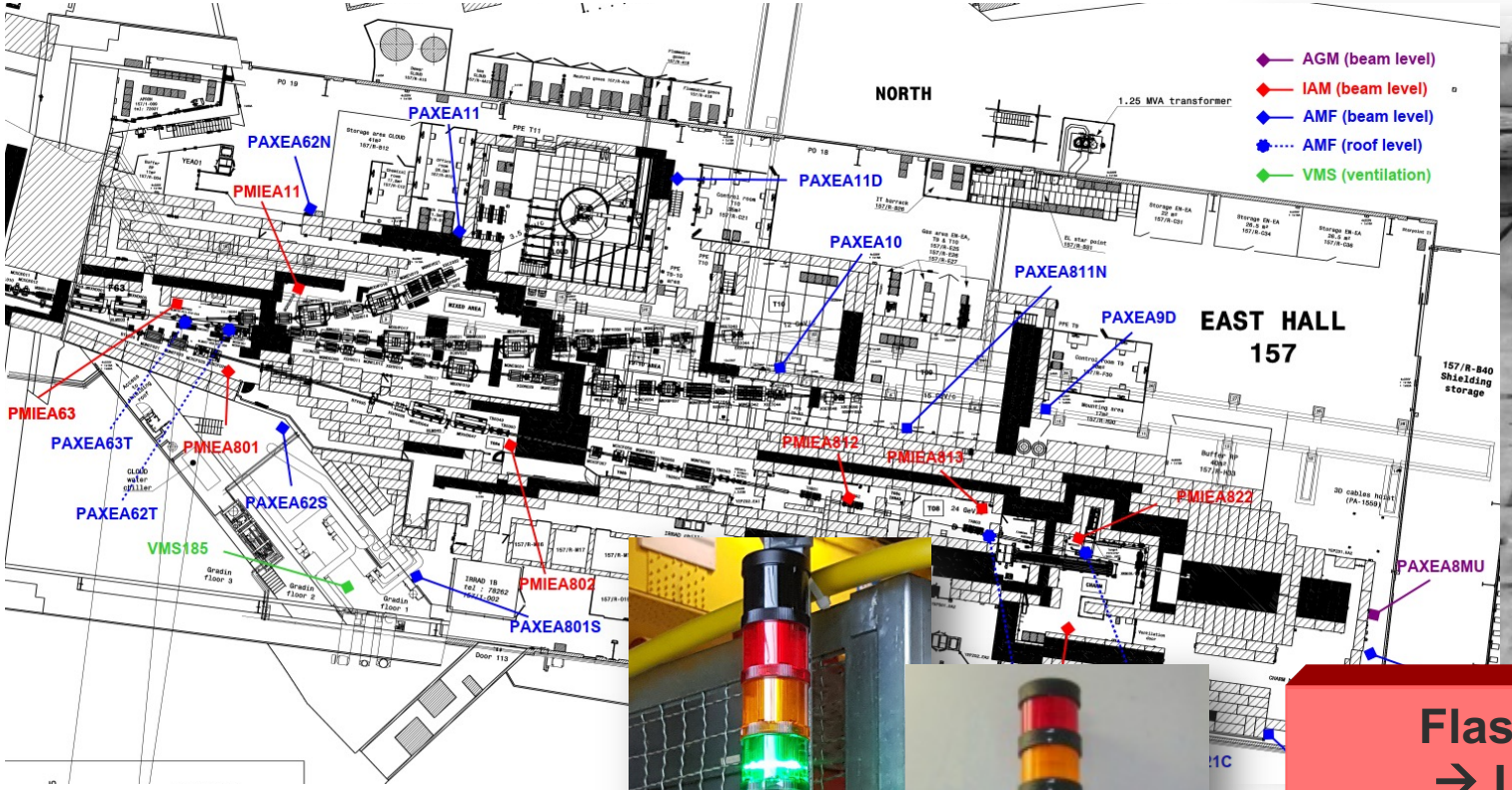
The personal dosimeter at CERN:

- Mandatory in Radiation Areas
- Assigned to a person
- Non-transmittable
- Dosimeters will be handed out after successful radiation protection training
- Dosimeters can be read out by yourself using dosimeter readers

Dosimeter provide a measure for the energy deposited in the body by ionising radiation.



Radiation monitoring and alarm displays



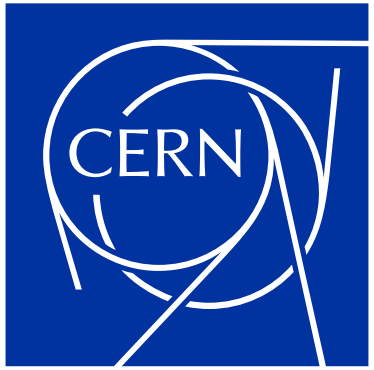
Flashing RED light + Audible ALARM
→ Leave the concerned area calmly

Flashing ORANGE light + WARNING SOUND
→ Limit your stay in the concerned area

Continuous green light = NORMAL situation
(low radiation levels, system OK)

Summary

- **All under control !**
  - Limit your time inside the radiation area
  - Wear your personal dosimeter at all time
  - All material leaving the experimental area must be measured by the radiation protection service
- **Any questions ?**
- **Enjoy your time at CERN and have a successful experiment !**



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