

Radiation Safety Instructions

for guests of the ELSA accelerator facility



May 2022

The Radiation Safety Instructions

ELSA = "Facility for the production of ionizing radiation"



There are **areas of enhanced radioactivity**.

- ➡ You are subject to the **German Radiation Safety Regulations**
- ➡ These regulations are formulated in the

Radiation Protection Act & Ordinance

- ➡ You must attend the **Radiation Safety Instructions**,
before you are allowed to enter the accelerator!

Measurement of doses = Energy deposition

Physics number:

$$\text{Energy dose: } D = \Delta E / \Delta M \quad [D] = \text{Gy} = \text{J/kg}$$

Consideration of the biologic response (ionization density):

$$\Rightarrow \text{Equivalent dose: } H = Q \cdot D \quad [H] = \text{Sv}$$

- Natural radioactivity $\approx 2.2 \text{ mSv/a}$
- Lethal dose $\sim 4000 \text{ mSv (LD50/30)}$, $\sim 7000 \text{ mSv (LD100/14)}$
- Members of the general public: max. 1 mSv/a
 \Rightarrow „Abgrenzungsvertrag“

Radiation Safety Areas

General rule:

Access to radiation safety areas only when necessary!

General state territory:

„Allgemeines Staatsgebiet“

max. 1 mSv/a additional radiation exposition

Supervised area: max. 6 mSv/a

„Überwachungsbereich“



Controlled area: max. 20 mSv/a

„Kontrollbereich“



Exclusion area

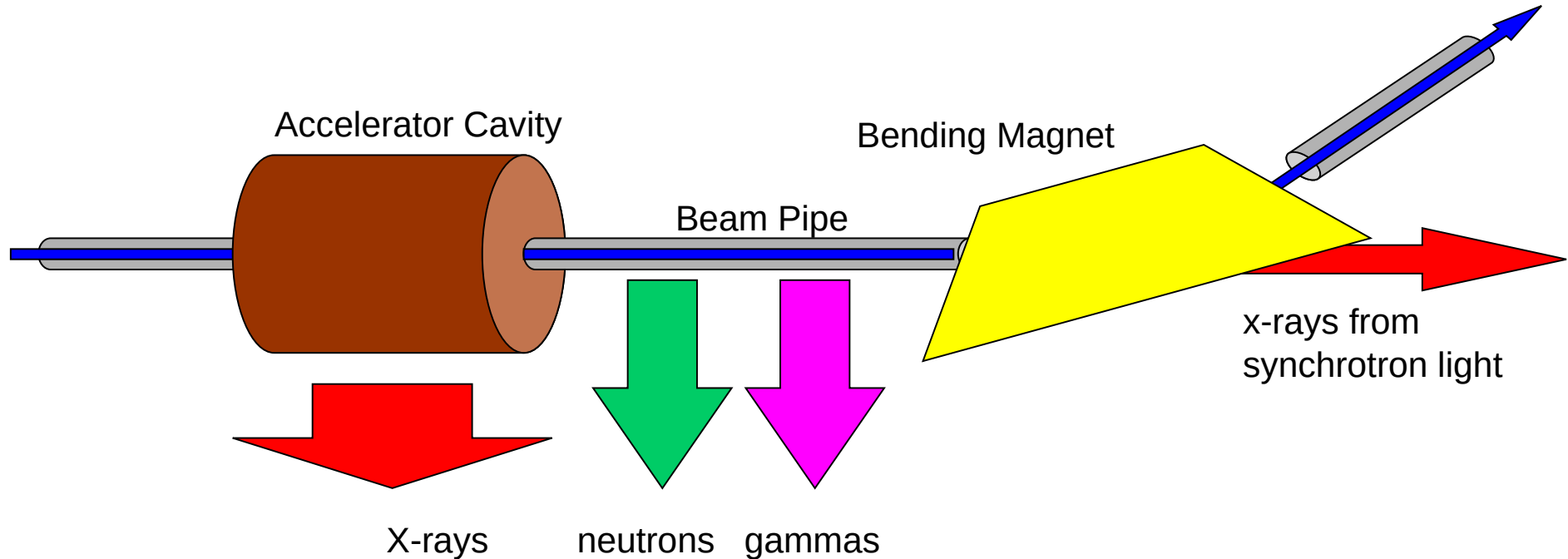
> 3 mSv/h

„Sperrbereich“

**No access to
exclusion areas!**

Sources of ionizing radiation when accelerator is on

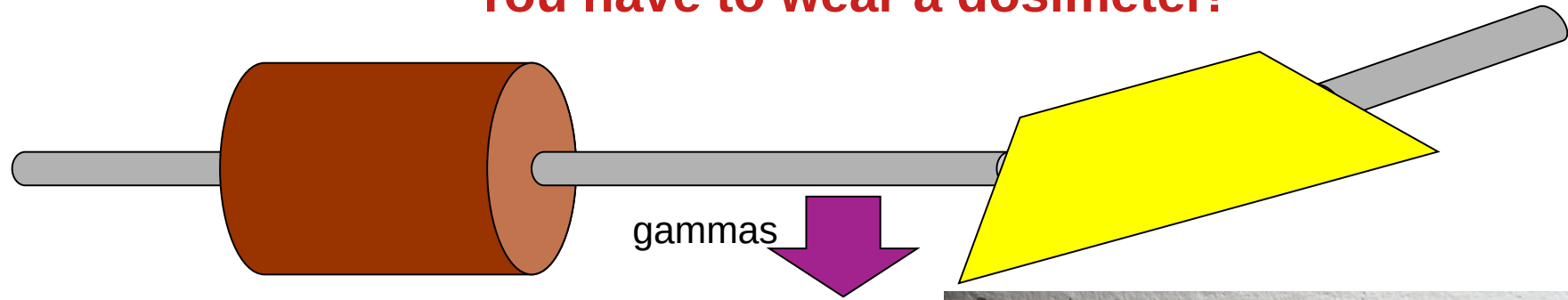
Accelerator hall and tunnel are exclusion areas,
that means you are not allowed to these areas



Sources of ionizing radiation when accelerator is off

Accelerator hall and tunnel are supervised areas (max. 6 mSv/a)

You have to wear a dosimeter!



General rules of radiation safety

- **Keep distance**
dose rate $\sim 1/R^2$
- **Do not stay longer than necessary in a radiation safety area**
dose \sim length of time
- **Use shielding**
(Not relevant for visitors)

Rules for the Access to Radiation Safety Areas

- Persons under the age of 16 and pregnant women are not allowed to enter the facility.
- Eating, drinking and smoking are strictly prohibited in the radiation safety areas!
- Locations with increased activity are marked by labels.
Do not touch! Keep distance!
- General rule: **do not touch anything!**
- Stay with the group and follow the instructions of the guides!
- There is one electronic dosimeter per group.
- After the tour: **wash your hands!**

Thank you for your attention