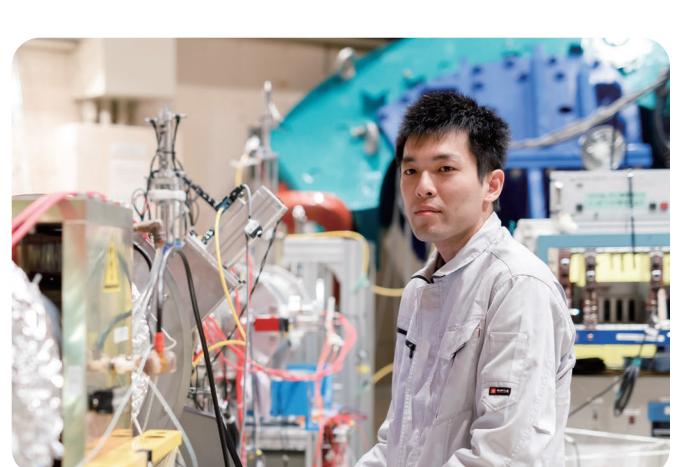


# 2D BEAM PROFILE MONITOR for $\alpha$ -EMITTER



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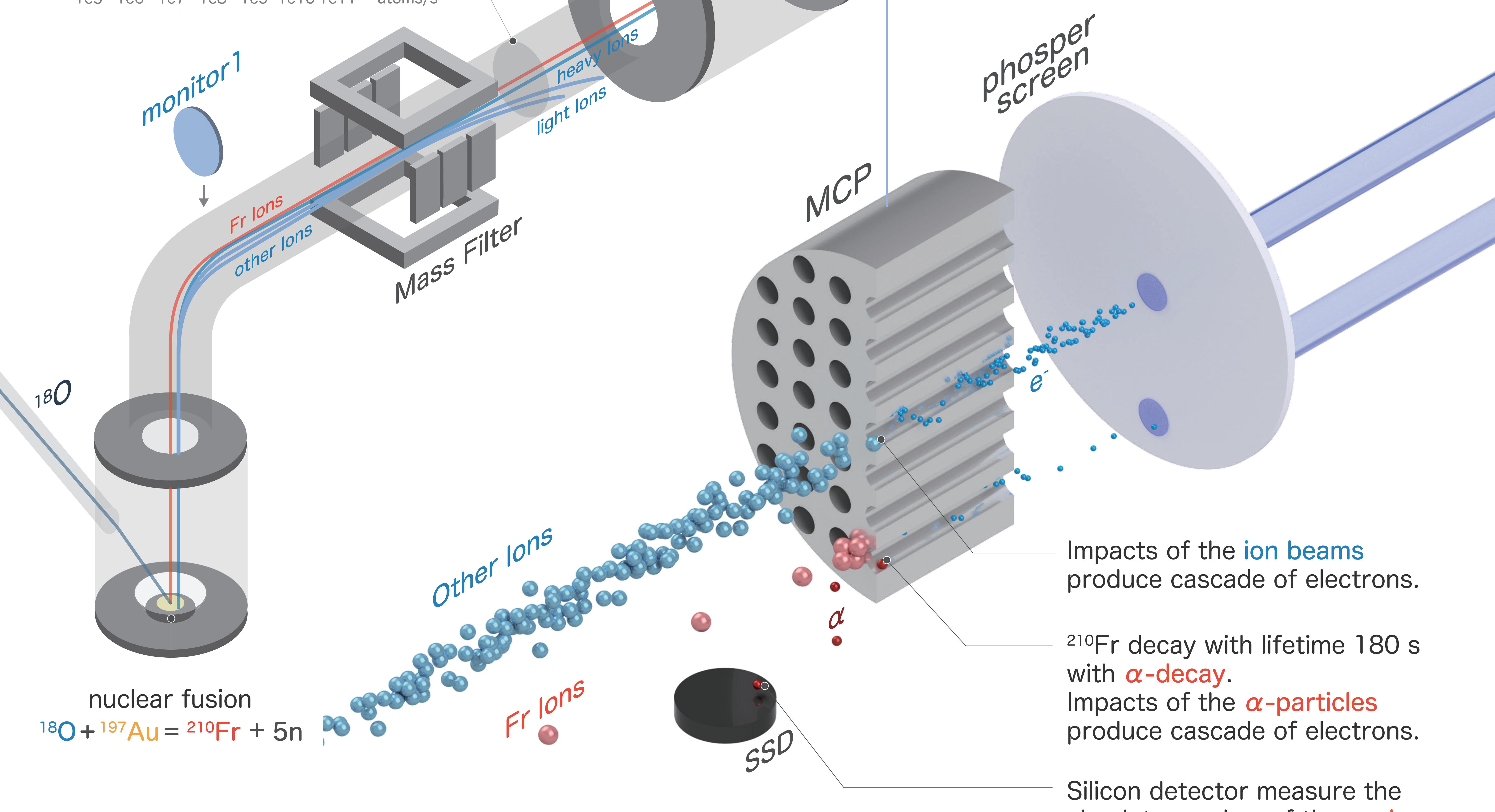
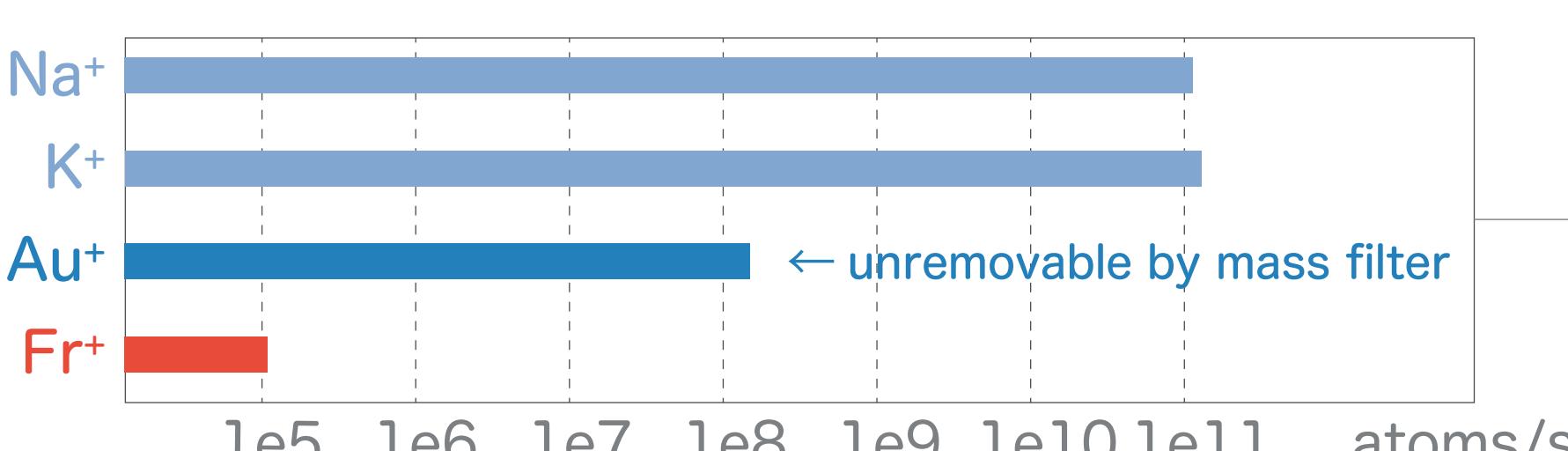
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## collaborators

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## point 1 Larger number of other ions

-> selectable monitor for  $\alpha$ -emitter and other ions



## Overview

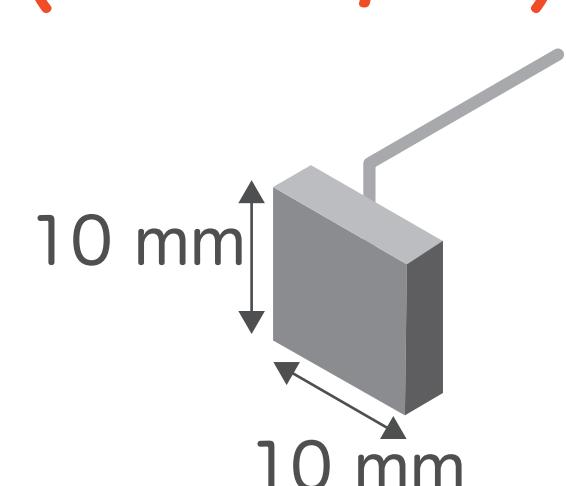
We developed two-dimensional beam profile monitors for  $\alpha$ -emitters such as francium ions along with other larger number of ions at CYRIC in Tohoku university. Francium is produced by the fusion reaction between the oxygen beam from the cyclotron accelerator and gold target, and a far larger number of other ions are also emitted from the target. Thus it was difficult to measure the beam profile of francium hidden by these ions. We installed two beam profile monitor consisted of the micro-channel plate and phosphor screen. If we stop the beam after the beam injection to the monitor in sufficient time, we can only observe the fluorescence of the  $\alpha$ -particle emitted by francium atoms on the surface of the plates.

## point 2

## focus to the small target

-> high image resolution (~100  $\mu$ m)

Fr ions are accumulated to the Yttrium foil. Fr ions are neutralized and load to the trapping area by heating the foil.



Impacts of the ion beams produce cascade of electrons.

<sup>210</sup>Fr decay with lifetime 180 s with  $\alpha$ -decay.

Impacts of the  $\alpha$ -particles produce cascade of electrons.

Silicon detector measure the absolute number of the  $\alpha$ -decay.

## Observation

