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With a source so small to fit in one hand": Fermi and the discovery of neutron-induced radioactivity

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"With a source so small to fit in one hand": Fermi and the discovery of neutron-induced radioactivity"
On the 120th anniversary of the birth of Enrico Fermi (1901-1954), we will try to reconstruct the extraordinary discovery of neutron-induced radioactivity made by him, working alone, in March 1934.
For this discovery, together with that, in the following October, of the effect of the slowing down of neutrons in activating various substances, Fermi was awarded the Nobel Prize for Physics in 1938. This was the second Nobel Prize given to an Italian in this discipline, after that to Guglielmo Marconi in 1909, on an equal merit with Carl Ferdinand Braun.
In this contribution, we will focus mostly on the experimental equipment Fermi used, like the original neutron sources preserved in Italy and abroad. Particular attention is paid to the role played by the Radium Office of the Istituto Superiore di Sanità in Rome in providing Fermi with the "radium emission" (Radon-222) used to make his radon-beryllium neutron sources. This particular type of investigation allows us to reconstruct what Fermi actually achieved in his laboratory, to gain a better insight into his methodological choices, and, ultimately, to understand how special circumstances conspired to make the discovery of neutron-induced radioactivity possible.

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