

# Italian Government Slams Brakes on 'Piezonuclear' Fission

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Italy's research and education minister Francesco Profumo has heeded the call from more than 1000 Italian scientists not to fund research into a controversial and disputed form of nuclear fission. The scientists had signed an online petition urging Profumo to block research on "piezonuclear" reactions at the National Institute of Metrological Research (INRIM). The petitioners say they are concerned that the institute's president, Alberto Carpinteri, was prioritizing research on the subject and that Profumo was about to place a second proponent of the research on the institute's scientific council. But Profumo has told *ScienceInsider* that he changed his mind about the council nomination and that he has "no intention" of funding piezonuclear research without the backing of the scientific community.

Carpinteri, a civil engineer at the Politecnico di Torino in Turin, Italy, has worked on the controversial research with a handful of other Italian scientists since 2008. His collaborators include Fabio Cardone, a physicist at the National Research Council in Rome. The researchers claim that when they crush various kinds of rock, they observe very high emissions of neutrons: 10 times the background level in the case of granite, and 100 times in the case of basalt. They interpret the emissions as being due to the splitting, or fission, of iron atoms in the rock into lighter atoms such as those of aluminum. Unlike the materials used in conventional fission reactions, the crushed rock does not emit ionizing gamma rays or leave behind radioactive waste, the researchers say.

Speaking to *ScienceInsider*, Carpinteri acknowledged that the group's conclusion is controversial, as established nuclear physics shows that the compression could not supply the enormous amounts of energy needed to split nuclei. But he argues that several other lines of evidence—including chemical analyses he and his colleagues have carried out on the rock samples before and after compression—indicate that nonstandard fission is indeed taking place. "The classical theory of fission still has a few holes in it," Carpinteri says.

Other researchers, however, remain far from convinced. Three different groups, from Canada, Sweden, and Italy, published papers in 2010 criticizing the rock-compression experiments and similar work by Cardone. And in a paper uploaded to the arXiv preprint server on 29 May, nine researchers from INRIM took aim at the chemical analysis carried out on the rock samples. They show that many identical numbers reported in the analysis, which are quoted to two decimal places, are more closely correlated than would be expected from independent measurements—although the paper says nothing about how the correlation might have occurred.

The online petition, started 24 May, urges Profumo not to spend public research money on what it calls projects "without, at least for the moment, any scientific foundation." The petitioners argue that INRIM's work on piezonuclear reactions would "bring discredit to the whole research system."

The organizer of the petition, Politecnico di Milano physicist Ezio Puppini, points out that INRIM's latest 3-year plan, approved in February, lists research on piezonuclear reactions as part of a broader €10 million program on nuclear technology. Puppini argues that even if piezonuclear research was worthwhile, either Italy's nuclear physics institute, INFN, or its energy institute, ENEA, would be a more natural home for it. INRIM "has no experience in this area," he says.

Specifically, Puppini and his co-petitioners were concerned that Profumo had proposed Cardone as a candidate to fill one of the seven vacancies on INRIM's scientific council. But Profumo says he will instead put forward the names of two foreign candidates: Elisabeth Giacobino, a physicist at the Université Paris VI in France who has said she will accept the position if offered it, and Ernst Göbel, former president of Germany's national metrology institute, PTB, who has yet to respond.

Regarding funding for the controversial research, Carpinteri says his group at the Politecnico di Torino has spent 4 years researching piezonuclear fission with €50,000 in funds he was able to spend at his discretion. He says INRIM has not yet spent "even a Euro" on the research, but that it had asked the ministry for a total of €500,000 over the next 3 years as part of the €10 million nuclear program, money that would be separate from the institute's core funding.

Profumo says that he has not personally received any request for funding of piezonuclear research from INRIM (although he said it was possible that his ministry had). But he adds that he would send any such request out for peer review before making a decision. "It seems to me that the scientific community has expressed itself very clearly," he says, referring to the petition. "I hope that the [new] scientific council directs the institute in the right direction." The institute has a "different mission" from piezonuclear research, Profumo says.