DAMA sheds light on dark-matter particles

SIR — We were disconcerted to see that the experiment XENON10 was the main focus of your News Feature 'Welcome to the dark side' on searches for particle dark matter (*Nature* **448,** 240–245; 2007), even though it is still in its infancy. The well-established DAMA/NaI experiment, on the other hand, was confined to a box titled 'Contested results'.

Experiments searching for dark-matter particles must be able to discriminate between a dark-matter signal and background signals created by other particles. Because the number of dark-matter particles hitting Earth is expected to vary during the course of a year, one strategy is to look for an annual variation (with many specific features) in the frequency of peculiar events registered by a detector. Running successfully for seven years, the DAMA/NaI experiment, with its 100-kilogram sodium iodide target, has detected such a peculiar annual variation, the properties of which meet those expected of a dark-matter signal with a confidence level of more than six standard deviations.

It has been proved quantitatively that no effect could produce this signal apart from dark-matter particles. Also, the DAMA effect is not contradicted by the results of other experiments because these experiments take a different approach, and so are unable to investigate the same effect.

The DAMA effect has been proved to be compatible with the most popular dark-matter candidate: the neutralino. Moreover, the DAMA experiment is sensitive to physical scenarios and candidates other than the neutralino — to which other experiments are either poorly sensitive or even blind.

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