

**THE “VILLALBETO DE LA PEÑA” METEORITE FALL:
BOLIDE DESCRIPTION, RECOVERY AND
CLASSIFICATION.**

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An impressive fireball of absolute magnitude -18.1 was observed around 16h46m45s ± 10s UTC on Sunday 4 January 2004. Although it appeared in broad daylight it was seen by thousands of people, who were attending diverse festivities in the northern part of the Iberian Peninsula. Some of them were able to obtain a video record and photographs of the fireball flight and the persistent train. The fireball coursed north-eastward over the Leon and Palencia provinces and experienced various explosions along its trajectory; the main fragmentation occurred at 24±1 km. The biggest fragments continued their flight, producing light below 20 km. After the dark flight, many fragments with a total mass on the order of tens of kilograms reached the ground. Due to the small slope of the atmospheric trajectory and many fragmentation events, the meteorites were dispersed over a large impact area. Thundering detonations were heard over a wide area and several localities in Leon and Palencia felt a strong pressure wave that made buildings and windows tremble. A long, smoky trail remained visible in the sky for nearly 30 minutes.

The first meteorites, covered with a black fusion crust, were found one week later near Villalbeto de la Peña, in northern Palencia (Spain). Our team developed in the following weeks an intensive campaign to recover all possible meteorites and to determine their exact positions. Over 3 kg have been recovered to date from different villages located in a wide area. The meteorite has been named *Villalbeto De la Peña* in reference to the village where the first specimens were recovered. Microprobe analyses of olivines and pyroxenes and petrographic examination of two thin sections of the type specimen reveal that the meteorite is an L6 (S4) chondrite. We are currently reconstructing the trajectory of the fireball, from an altitude of ca. 70 km to the ending point below 20 km, and determining the orbit of the parent body in the solar system. This will represent another valuable case where it is possible to determine accurately the origin of a recovered meteorite. The analysis of the data gathered on the speed, luminosity, sound phenomena, penetration of the material in the atmosphere and the persistent train as well as the analysis of the meteorite itself will provide the best documented case of a meteorite fall in Spain. We thank the *Instituto Nacional de Meteorología* the atmospheric profile that enabled modeling of the dark flight of the meteorites; we also thank the members of the *Asociación Leonesa de Astronomía* and the *Agrupación Astronómica Palentina* for their collaboration in the recovery tasks.