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The KM3NeT ultra-high-energy neutrino and its possible blazar origin

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The detection by the KM3NeT experiment of the ultra-high-energy event KM3-230213A is a milestone in neutrino astrophysics. With an energy estimated at ~220 PeV, it is the most energetic neutrino observed to date, challenging the current understanding of the cosmic spectrum. Its observation opens the question of its astrophysical origin. Blazars and their relativistic jets have been proposed as promising sources of both astrophysical neutrinos and ultra-high-energy cosmic rays. In this talk, I will present the ultra-high-energy event KM3-230213A and its observed signature. I will describe the identification of seventeen candidate blazars in the 3° radius error region of the neutrino, through their multiwavelength features. The candidates' properties are characterised throughout the whole electromagnetic spectrum, from radio to gamma rays, thanks to a wide collection of archival data and dedicated observations. Three sources exhibit flaring behaviour in one of the examined bands, in coincidence with the neutrino arrival time. While none of these can be unequivocally associated with the neutrino, I will discuss the implications of a possible blazar origin for the KM3NeT event.

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