Death from across the galaxy

by Bend_Weekly_News_Sources

A type of coÂ-losÂ-sal cosÂ-mic exÂ-ploÂ-sion could beam leÂ-thal raÂ-diÂ-aÂ-tion across a gaÂ-laxy, fryÂ-ing any life forms in its path, a new analÂ-yÂ-sis has found.The blasts are thought to ocÂ-cur rareÂ-ly in our Milky Way galÂ-axy, but more ofÂ-ten in those where stars are born and die more freÂ-quentÂ-ly. These inÂ-clude arÂ-eas where asÂ-troÂ-noÂ-mers hope to find Earth-like planÂ-ets ripe for life.

In a 1995 stuÂ-dy, Steve ThorÂ-sett of PrinceÂ-ton UniÂ-verÂ-siÂ-ty in PrinceÂ-ton, N.J. calÂ-cuÂ-latÂ-ed that such events, called gamÂ-ma-ray bursts, might wreak havÂ-oc on an Earth-like planÂ-et if they ocÂ-curred near it. But sciÂ-enÂ-tists donâ€™t fulÂ-ly unÂ-derÂ-stand the exÂ-tent of the posÂ-siÂ-ble damÂ-age. EsÂ-peÂ-cialÂ-ly unÂ-clear is how far a burst would have to ocÂ-cur to afÂ-fect life, acÂ-cordÂ-ing to the auÂ-thors of the new stuÂ-dy.

Artist's concept of life in the OrÂ-doÂ-viÂ-cian era (490 milÂ-lion to 443 milÂ-lion years ago). (CourÂ-teÂ-sy NAÂ-SA)

Gamma-ray bursts are flashes of high-enÂ-erÂ-gy raÂ-diÂ-aÂ-tion found to ocÂ-cur ranÂ-domÂ-ly in space. At least some are thought to be asÂ-soÂ-ciÂ-atÂ-ed with exÂ-tremeÂ-ly masÂ-sive stars that, havÂ-ing burnt out, colÂ-lapse to form black holes.In the new reÂ-search, DougÂ-las Galante and JorÂ-ge ErÂ-nesÂ-to HorÂ-vath of the UniÂ-verÂ-siÂ-ty of SÃ£o PaÂ-oÂ-lo, BraÂ-zil, arÂ-gued that gamÂ-ma-ray bursts could shine their leÂ-thal efÂ-fects across a whole galÂ-axy, and damÂ-age life over greatÂ-er disÂ-tances still. The study is to apÂ-pear in a forthÂ-comÂ-ing isÂ-sue of the InÂ-terÂ-naÂ-tionÂ-al JourÂ-nal of AsÂ-troÂ-biÂ-olÂ-oÂ-gy.The bursts could cause â€œglobal enÂ-viÂ-ronÂ-menÂ-tal changes and bioÂ-spheric damÂ-ageâ€• even at disÂ-tances five times the Milky Wayâ€™s width, they wrote. Our Milky Way is a relÂ-aÂ-tively large, spirÂ-al galÂ-axy, about 100,000 light-years wide (a light-year is the disÂ-tance light travÂ-els in a year).

Gamma-ray bursts are thought to emerge mainÂ-ly from the poles of a colÂ-lapsÂ-ing star. This creÂ-ates two, opÂ-poÂ-siteÂ-ly-shinÂ-ing beams of raÂ-diÂ-aÂ-tion shaped like narÂ-row cones. PlanÂ-ets not lyÂ-ing in these cones would be comÂ-parÂ-aÂ-tiveÂ-ly safe; the chief worÂ-ry is for those that do.Galante and HorÂ-vath idenÂ-tiÂ-fied three asÂ-pects of gamÂ-ma-ray bursts as parÂ-tÂ-iÂ-cuÂ-larÂ-ly deadly. The first is a flash of gamÂ-ma rays, the highÂ-est-enÂ-erÂ-gy form of light. The flash can imÂ-peÂ-rÂ-il even the most raÂ-diÂ-aÂ-tion-resistant orÂ-ganÂ-isms known, the bacÂ-teÂ-riÂ-um DeinococÂ-cus raÂ-dioÂ-duÂ-rans, the reÂ-searchÂ-ers wrote. This miÂ-crobe can take 3,000 times the raÂ-diÂ-aÂ-tion that would kill a huÂ-man: the asÂ-sault shreds its geÂ-nome to hunÂ-dreds of bits, but the harÂ-dy bug stitches them back toÂ-gethÂ-er.Galante and HorÂ-vath calÂ-cuÂ-latÂ-ed that for a planÂ-et with a thin atÂ-mosÂ-phere, the gamÂ-ma flash could kill 90 perÂ-cent of D. raÂ-dioÂ-duÂ-rans from disÂ-tances up to three times our galÂ-axÂ-yâ€™s width. A thick atÂ-mosÂ-phere would proÂ-tect the miÂ-crobes from this, but not necÂ-esÂ-sarÂ-iÂ-ly from a secÂ-ond comÂ-poÂ-nent of the beam,

ulÂ-tÂ-raÂ-vioÂ-let raÂ-diÂ-aÂ-tion. UlÂ-tÂ-raÂ-vioÂ-let is a type of light slightÂ-ly lowÂ-er in enÂ-erÂ-gy than gamÂ-ma rays, but leÂ-thal, largeÂ-ly beÂ-cause it penÂ-eÂ-trates DNA very easÂ-iÂ-ly.

For thick-atÂ-mosÂ-phere planÂ-ets, a gamÂ-ma-ray burstâ€™s ulÂ-tÂ-raÂ-vioÂ-let rays would kill 90 perÂ-cent of D. raÂ-dioÂ-duÂ-rans at disÂ-tances rangÂ-ing from 13,000 to 62,000 light years, about two-thirds the gaÂ-lacÂ-tic width, the reÂ-searchÂ-ers calÂ-cuÂ-lated.Life surÂ-vivÂ-ing that onÂ-slaught would have to conÂ-tend with a third efÂ-fect, deÂ-pleÂ-tion of the atÂ-mosÂ-phereâ€™s proÂ-tective ozone layÂ-er by the burst. This would kill 90 perÂ-cent of D. raÂ-dioÂ-duÂ-rans at up to 40 perÂ-cent of the disÂ-tance across the Milky Way, GaÂ-lante and HorÂ-vath esÂ-tiÂ-matÂ-ed.Gamma-ray bursts are deÂ-tected roughÂ-ly once dai-ly someÂ-where in the sky. The likeÂ-liÂ-hood of one strikÂ-ing Earth has been deÂ-batÂ-ed. ReÂ-searchÂ-ers at Ohio State UniÂ-verÂ-siÂ-ty calÂ-cuÂ-latÂ-ed, in a papeÂ-r in the reÂ-search jourÂ-nal AcÂ-ta AsÂ-troÂ-noÂ-miÂ-ca late last year, that the probÂ-aÂ-bilÂ-iÂ-ty is virÂ-tuÂ-alÂ-ly nil. Our galÂ-axÂ-yâ€™s chemÂ-iÂ-cal comÂ-poÂ-siÂ-tion is inÂ-comÂ-patÂ-iÂ-ble with strong gamÂ-ma-ray bursts, they wrote. On the othÂ-er hand, asÂ-troÂ-noÂ-mers at the UniÂ-verÂ-siÂ-ty of KanÂ-sas in LawÂ-rence, Kan. and at NASA hyÂ-pothÂ-eÂ-sized in 2004 that at least one has alÂ-ready struck Earth, causÂ-ing the so-called OrÂ-doÂ-viÂ-ciÂ-an Mass ExÂ-tincÂ-tion 450 milÂ-lion years ago. The Earthâ€™s secÂ-ond most devÂ-asÂ-tatÂ-ing exÂ-tincÂ-tion, it deÂ-stroyed an arÂ-ray of the life forms that had flourÂ-ished unÂ-til then, reÂ-strictÂ-ed in that time to the seas.â€œReÂ-cently, gamma-ray bursts were recÂ-ogÂ-nized as some of the most enÂ-erÂ-getÂ-ic asÂ-tÂ-roÂ-physÂ-iÂ-cal events since the Big Bangâ€• that gave birth to our uniÂ-verse, GaÂ-lanÂ-te and HorÂ-vath wrote. â€œIt is unÂ-deÂ-niÂ-aÂ-ble that damÂ-age to the biÂ-oÂ-ta could be seÂ-vere if a burst strikes (or has struck) the planÂ-et.â€•

Courtesy World Science staff

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