

Radio structures in radio-quiet quasars with extremely powerful X-ray outflows

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When active galactic nuclei have accretion rates close to their Eddington limits, radiatively driven outflows at mildly relativistic velocities in a quite large aperture would be launched. Some powerful wind-like outflows may produce strong shocks and thus have significant non-thermal emission. The outflow-driven radio emission may be detectable in some radio-quiet quasars with extremely powerful and long-lived X-ray outflows and remarkably high bolometric luminosities. To investigate the speculation, we performed very-long-baseline interferometric (VLBI) observations of three optically luminous quasars (PDS 456, IRAS F11119+3257, PG 1211+143). In our VLBI images, all these quasars have relatively extended structures. With respect to their accurate Gaia positions, we find that their radio cores are either quite faint or undetected. Assuming that the radio cores also host wind-like outflows, we provide upper limits on their radio luminosities. Furthermore, there are two-sided jets observed on sub-kpc scales in PDS 456 and IRAS F11119+3257. This provides the strong evidence for the episodic jet activity at the state of very high accretion rate.