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VSOP Monitoring of the Quasar 1928+738

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One limitation of the VSOP mission is that several famous superluminal sources such as 3C273 cannot be monitored with good uv-coverage throughout the lifetime of the VSOP mission at regular intervals that are spaced closely enough to follow the evolution in the fine-scale source structure. The reason for this is that the HALCA spacecraft cannot observe sources outside certain restricted ranges of sun angle, defined to be the time variable angle between the source and the sun. However, sources that lie within 10 degrees of the ecliptic poles can be observed throughout the year and observations are not restricted to narrow temporal windows. Furthermore, the best ground-based uv-coverages are obtained for circumpolar sources and consequently these will be the sources for which the maximum amount of space VLBI data will be obtained with a given ground array. We have began a VSOP monitoring campaign at 5 GHz on the relatively low redshift (z=0.3) superluminal quasar 1928+738 which is both a circumpolar source and lies 10 degrees away from the ecliptic pole.

1928+738 is in the S5 polar cap sample and has been well studied both on the arsecond-scale and mas-scale. 22 GHz observations have shown that the motion of the VLBI components in 1928+738 is inconsistent with simple linear expansion along a fixed position angle (PA) for all components. Indeed, 1928+738 was one of the first sources for which helical jet motion was proposed and it has been further proposed that a massive binary black hole (MBBH) system is responsible for the sinusoidal jet ridge line observed at 22 GHz over a 5 year period. Our VSOP observations are designed to check this proposal.

So far, we have imaged 1938+378 at 4 epochs that span a time range of 8.5 months. In that time, we have observed structural changes of a type never before seen in this source. In particular, the jet bend angle 6.3 pc from the core is seen to vary dramatically with time. The validity of our VSOP images is confirmed at one epoch by a complementary 43 GHz VLBA observation.

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