Reconnection and Spire Drift in Coronal Jets

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It is observed that there are two morphologically-different kinds of X-ray/EUV jets in coronal holes: standard jets and blowout jets. In a standard jet, the spire is a single-strand spike that does not expand sideways and is much narrower than the base of the jet throughout the life of the jet. In a blowout jet, in its growth phase, the spire is a multi-stranded spray that expands sideways to become about as wide as or wider than the jet's base. In both kinds: (1) in the base of the jet there is closed magnetic field that has one foot in flux of polarity opposite that of the ambient open field of the coronal hole, and (2) in coronal X-ray/EUV images of the jet there is typically a bright point in the edge of the base. In the conventional scenario for jets of either kind, the bright point is a compact flare arcade, the downward product of interchange reconnection of closed field in the base with impacted ambient open field, and the upper product of this reconnection is the jet-outflow spire. In either kind of jet it is also often observed that the spire drifts sideways, usually away from the bright point. We present some examples of the bright point and the spire drift in observed standard jets and blowout jets. With cartoons of the magnetic field and its reconnection in jets, we point out: (1) if the bright point is a compact flare arcade made by interchange reconnection, then the spire should drift toward the bright point, and (2) if the bright point is instead a compact flare arcade made, as in a filament-eruption flare, by internal reconnection of the legs of the erupting sheared-field core of a lobe of the closed field in the base, then the spire, made by the interchange reconnection that is driven on the outside of that lobe by the lobe's internal convulsion, should drift away from the bright point. Therefore, from the observation that the spire often drifts away from the bright point, we infer: (1) in X-ray/EUV jets of either kind in coronal holes the interchange reconnection that generates the jet-outflow spire often does not make the bright point; instead, the bright point is made by reconnection inside erupting closed field in the base, as in a filament eruption, the eruption being either a confined eruption for a standard jet or a blowout eruption (as in a CME) for a blowout jet, and (2) in this respect, the conventional reconnection picture for the bright point in coronal jets is often wrong for observed coronal jets of either kind.