SS433: PERIODIC CHANGES IN THE RADIO STRUCTURE OF SCALE SIZE 10^{16} cm

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Radio observations have clearly demonstrated that the kinematic twin-jet model (Milgrom 1979; Abell and Margon 1979) is the correct description of the general behavior of SS433 and have determined the orientation parameters that could not be obtained from the optical observations (Gilmore and Seaquist 1980; Hjellming and Johnston 1981 (HJ); Niell, Lockhart, and Preston 1981 (NLP)). Figure 1 shows the observed position angle of the radio jet at a distance of approximately 0."15 from the core during the period 1979 May to 1981 May as determined from our VLBI measurements at 2.3 GHz. The mean position angle is $98^o \pm 2^o$ for a 20^o half-angle cone of precession about an inclination of 79^o to the line of sight. The phase is consistent with the expected propagation time out to 0."15 (10^{16}cm) at a speed of 0.26c for a distance to SS433 of 5 kiloparsecs (HJ; NLP).

From observations at three epochs using the antennas at Hat Creek (UC Berkeley), Big Pine (Caltech), and Goldstone (NASA), California at 2.3 GHz we have made hybrid VLBI maps of SS433. The angular resolution is about two days of travel time along the jets. For all three epochs the core is extended along the direction expected from the optical ephemeris and in the direction of the Eastern "blue" jet (HJ) and probably represents the beginning of another outburst. The maps (Figure 2) show that outside the core the jets are dominated by knots with brightness temperatures greater than 10^6K. (See also Schilizzi et al. in this volume). In February the two brightest knots were of comparable strength and age (approximately 8 days) suggesting that some ejections give rise to radio emission along both jets, even though the core appears extended to the East. In no case is the structure resolved perpendicular to the apparent direction of motion, thus setting an upper limit of 10^{15} cm on the transverse width of the knots.

Finally, we speculate that the differences in position between the predicted trajectories (given by the solid lines in Figure 2) and the locations of the observed knots are real and represent fluctuations in the direction of ejection of the source of the knots about the mean

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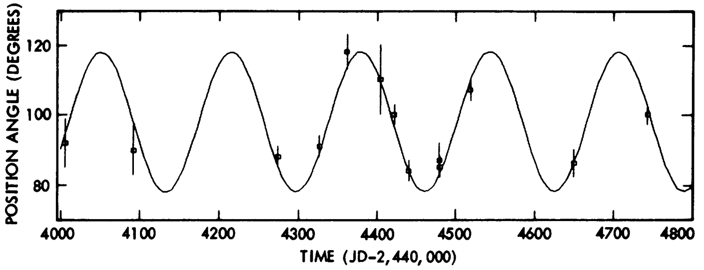

FIGURE 1

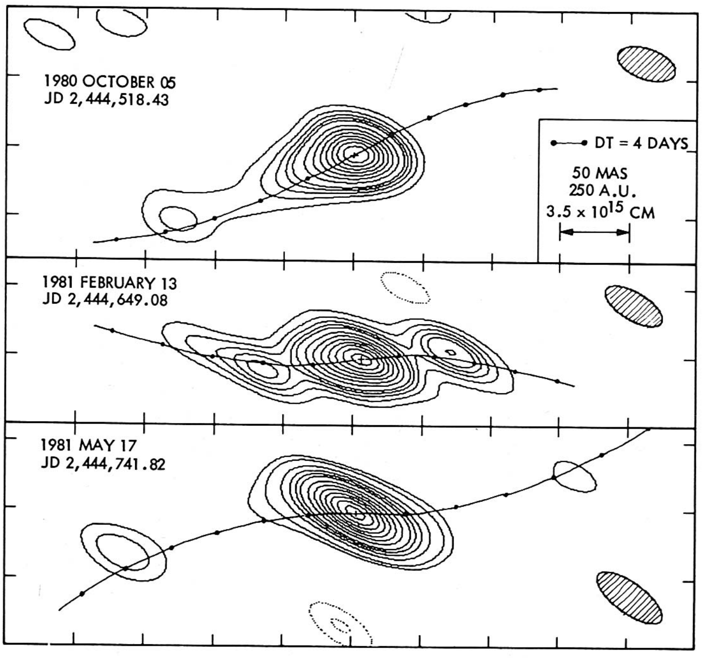

FIGURE 2

ephemeris. The observed angular fluctuations would produce deviations of the optical emission line radial velocities from the mean ephemeris which are comparable to those observed (Margon, Grandi, and Downs 1980).

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