d) The maximum Doppler shift is observed for the cloud at F: ✓
- It has the greatest speed ✓
- All of this speed is along the line of sight ✓

(See opposite and diagram on prev. page)

(I would have liked to prove the Doppler shift at F was maximum in magnitude, but I would have needed a radial mass distribution function)

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As long as $V(r)$ decreases with r as at F shows greatest Doppler shift

e) We can find out if a gas cloud has a net component of motion towards the Sun by looking for any Doppler shift in it's spectrum.

If radiation from the cloud is shifted towards longer wavelengths (redshifted), the gas cloud will have a net component of motion away from the Sun. Since orbital velocity decreases outwards, those at lesser radial distances from the Galactic centre than the Sun will have greater velocities (and thus angular velocities) than the Sun, so the distance between Sun and cloud will be increasing (while the angle from Sun to Gas cloud subtended at centre of Galaxy is less than pi) and radiation from the cloud will be redshifted; radiation from clouds A, F, and B will redshifted. ✓

If radiation from a gas cloud shows a Doppler shift to shorter wavelengths (is blueshifted), this will mean that the gas cloud has a net component of motion toward the Sun. ✓ Since orbital (and thus angular) velocities decreases outwards, those gas clouds at greater radial distances than the Sun will have a net component of motion toward the Sun (while angle subtended from Sun to gas cloud at centre of Galaxy is less than pi), ✓ and radiation from the gas cloud will be blueshifted; ✓ radiation from gas clouds C and D will be blueshifted.

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When the Sun and gas clouds pass in their orbits, either on the same or on opposite sides of the Galaxy, those clouds which showed redshifts will show blueshifts, and vice versa; thus each gas cloud will exhibit blueshifts at the Sun's position for half their orbits, and redshifts for the other half. Yes but this will be in about 10^8 yrs

Throughout this discussion I have assumed that motion is relative,

ie that relative motion is not motion.

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