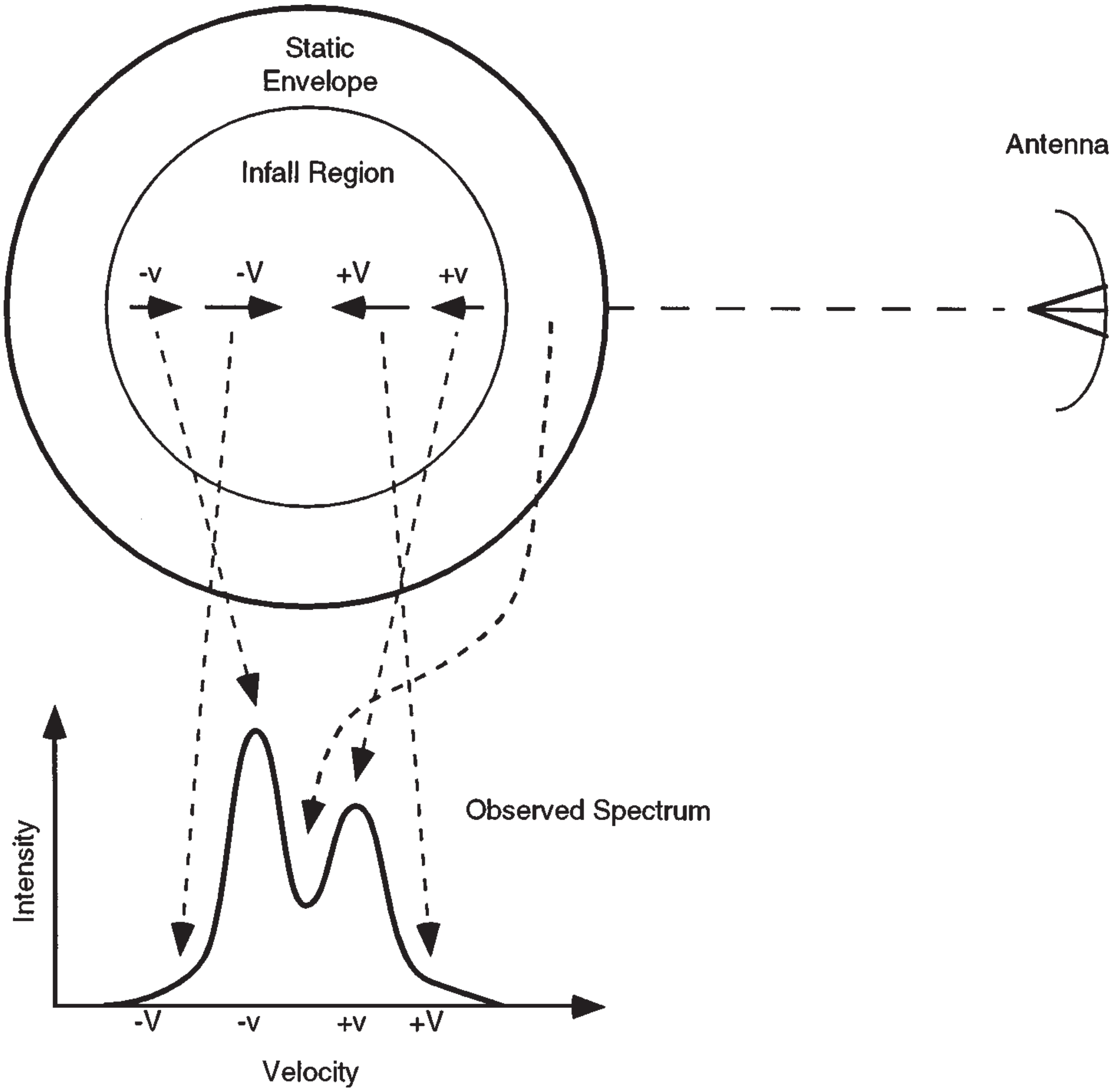

Figure 5 The origin of various parts of the line profile for a cloud undergoing inside-out collapse. The static envelope outside r_{inf} produces the central self-absorption dip, the blue peak comes from the back of the cloud, and the red peak from the front of the cloud. The faster collapse near the center produces line wings, but these are usually confused by outflow wings.

the line profiles to shift from blue to red-skewed on either side of the rotation axis, with the sign of the effect depending on how the rotation varies with radius (Zhou 1995). Maps of the line centroid can be used to separate rotation from collapse (Adelson & Leung 1988, Walker et al 1994).

To turn a collapse candidate into a believable case of collapse, one has to map the line profiles, account for the effects of outflows, model rotation if present, and show that a collapse model fits the line profiles. To date this has been done only for a few sources: B335 (Zhou et al 1993, Choi et al 1995), L1527 (Myers et al 1995,

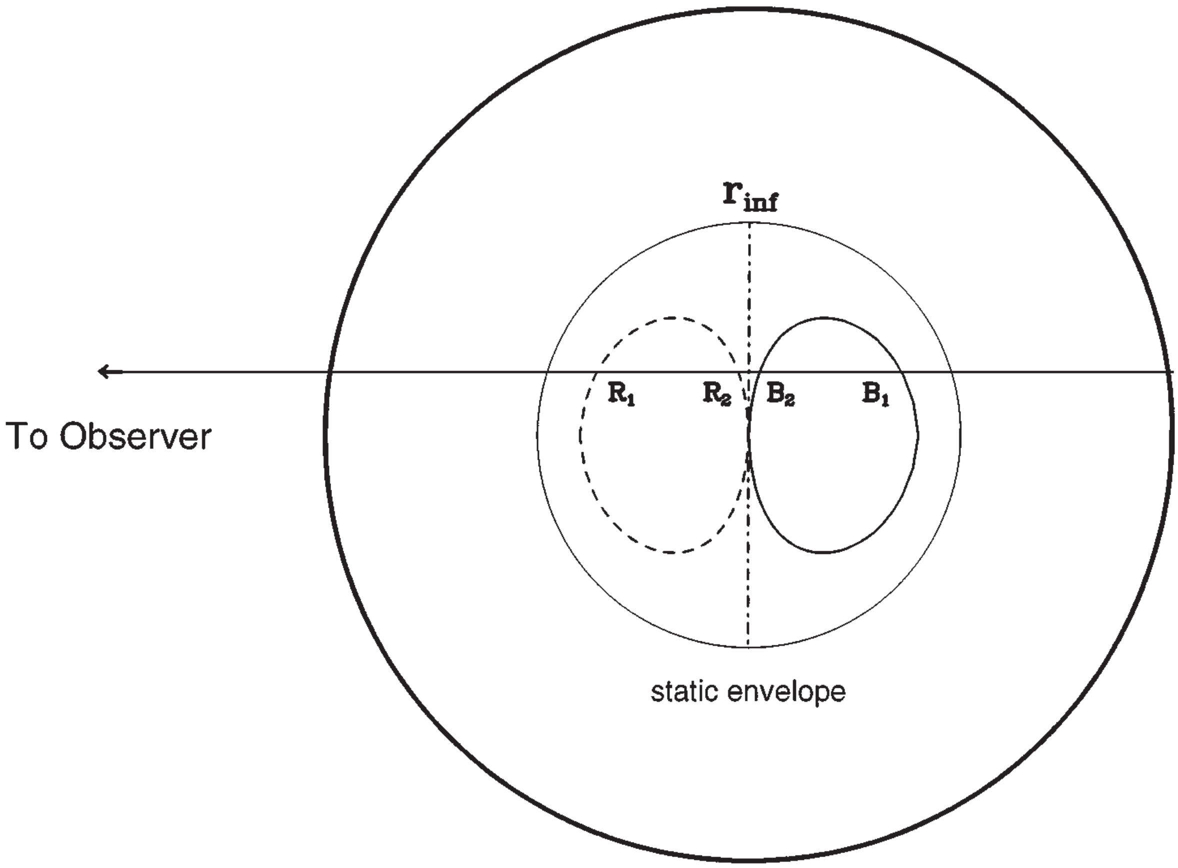

Figure 6 A schematic explanation of why line profiles of optically thick, high-excitation lines are skewed to the blue in a collapsing cloud. The *ovals* are loci of constant line-of-sight velocity, for $v(r) \propto r^{-0.5}$. Each line of sight intersects these loci at two points. The point closer to the center will have a higher T_{ex}, especially in lines that are hard to excite, so that $T_{ex}(R_2) > T_{ex}(R_1)$ and $T_{ex}(B_2) > T_{ex}(B_1)$. If the line is sufficiently opaque, the point R_1 will obscure the brighter R_2, but B_2 lies in front of B_1. The result is a profile with the blue peak stronger than the red peak (Zhou & Evans 1994).

Zhou et al 1996, Gregersen et al 1997), and *IRAS* 16293 (Zhou 1995, Narayanan et al 1998). Of this group, only *IRAS* 16293, rotating about 20 times faster than B335, is known to be a binary (Wootten 1989, Mundy et al 1992), supporting the idea that faster rotation is more likely to produce a binary. Mathieu (1994) reviews binarity in the pre–main-sequence stage, and Mundy et al (2000) discuss recent evidence on the earlier stages.

Interferometric observations have also revealed infall motions and rotational motions on scales of ~1000 AU in several sources (e.g. Ohashi et al 1997a, Momose et al 1998). Such studies can reveal how matter makes the transition from infall to a rotating disk. Inevitably, irregularities in the density and velocity fields will confuse matters in real sources, and these may be more noticeable with interferometers. Outflows are particularly troublesome (Hogerheijde et al 1998). Extreme blue/red ratios are seen in interferometric observations of HCO^+ and HCN $J = 1 \rightarrow 0$ lines, which are difficult to reproduce with standard models