Tangent Point Method to Estimate Galactic Rotational Velocity
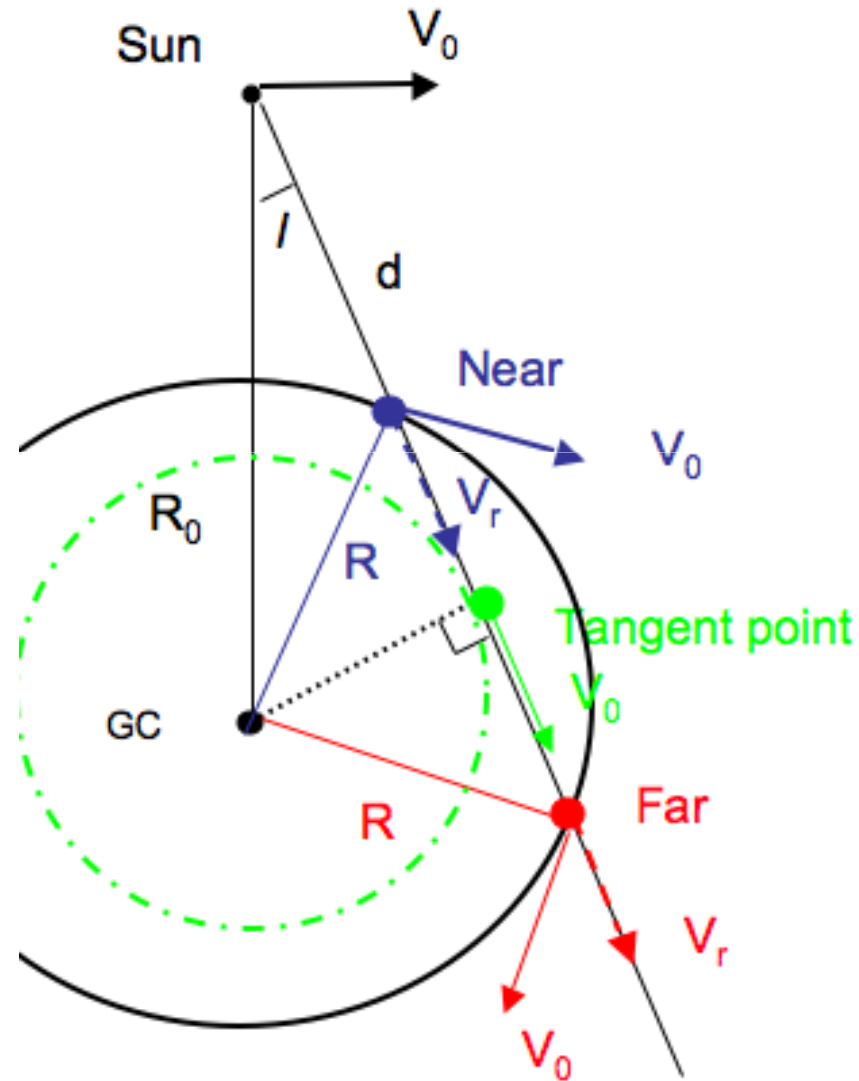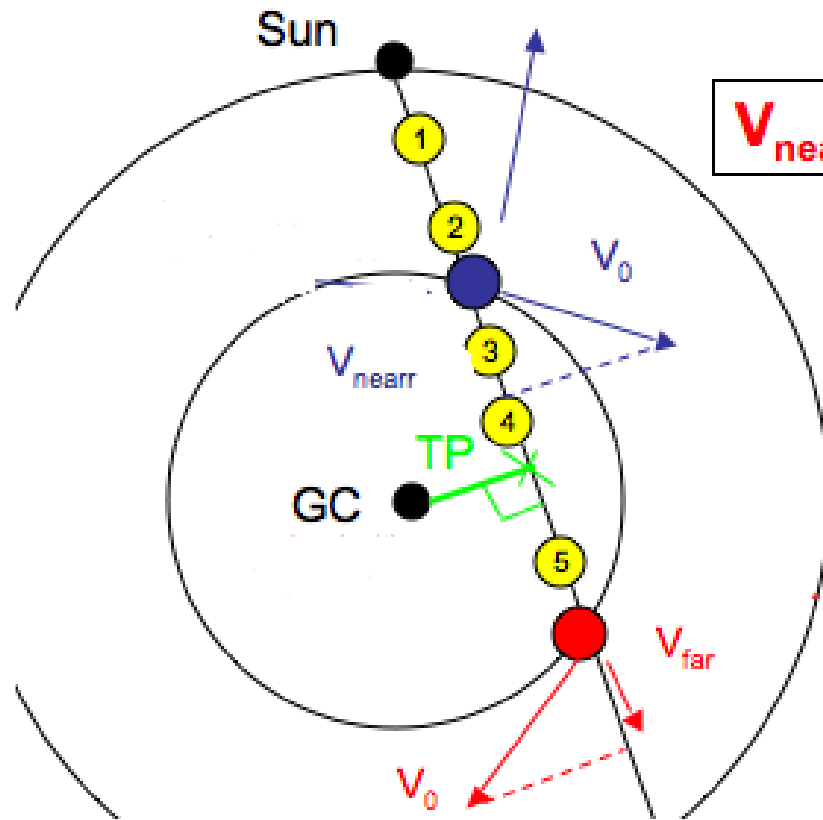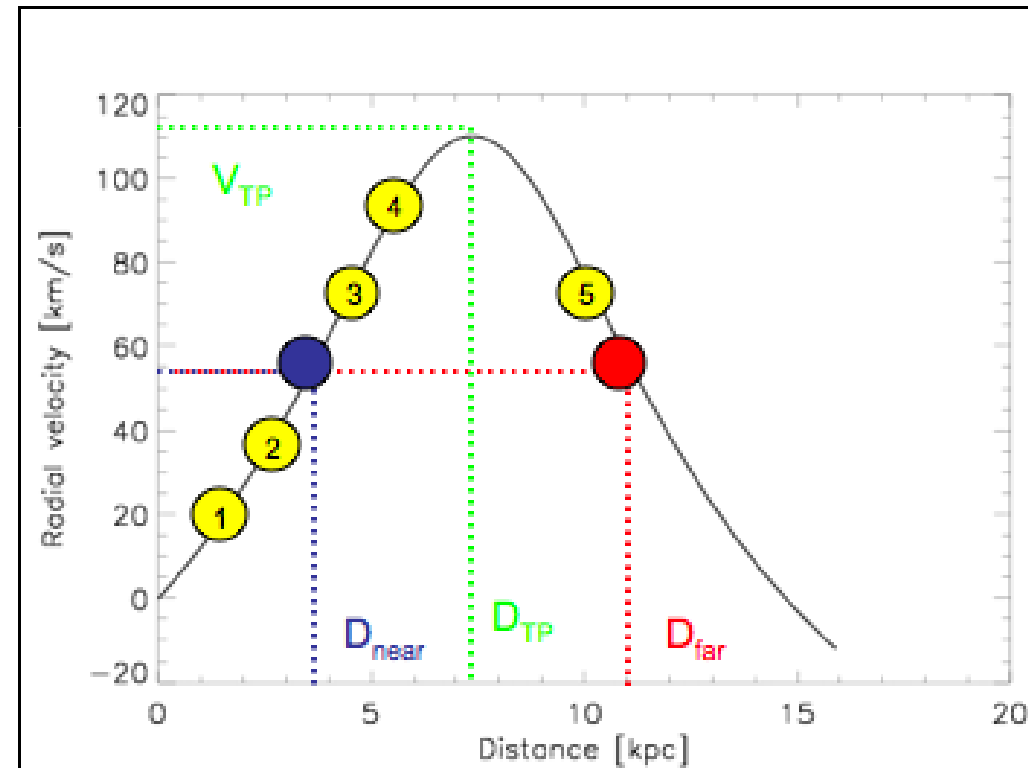
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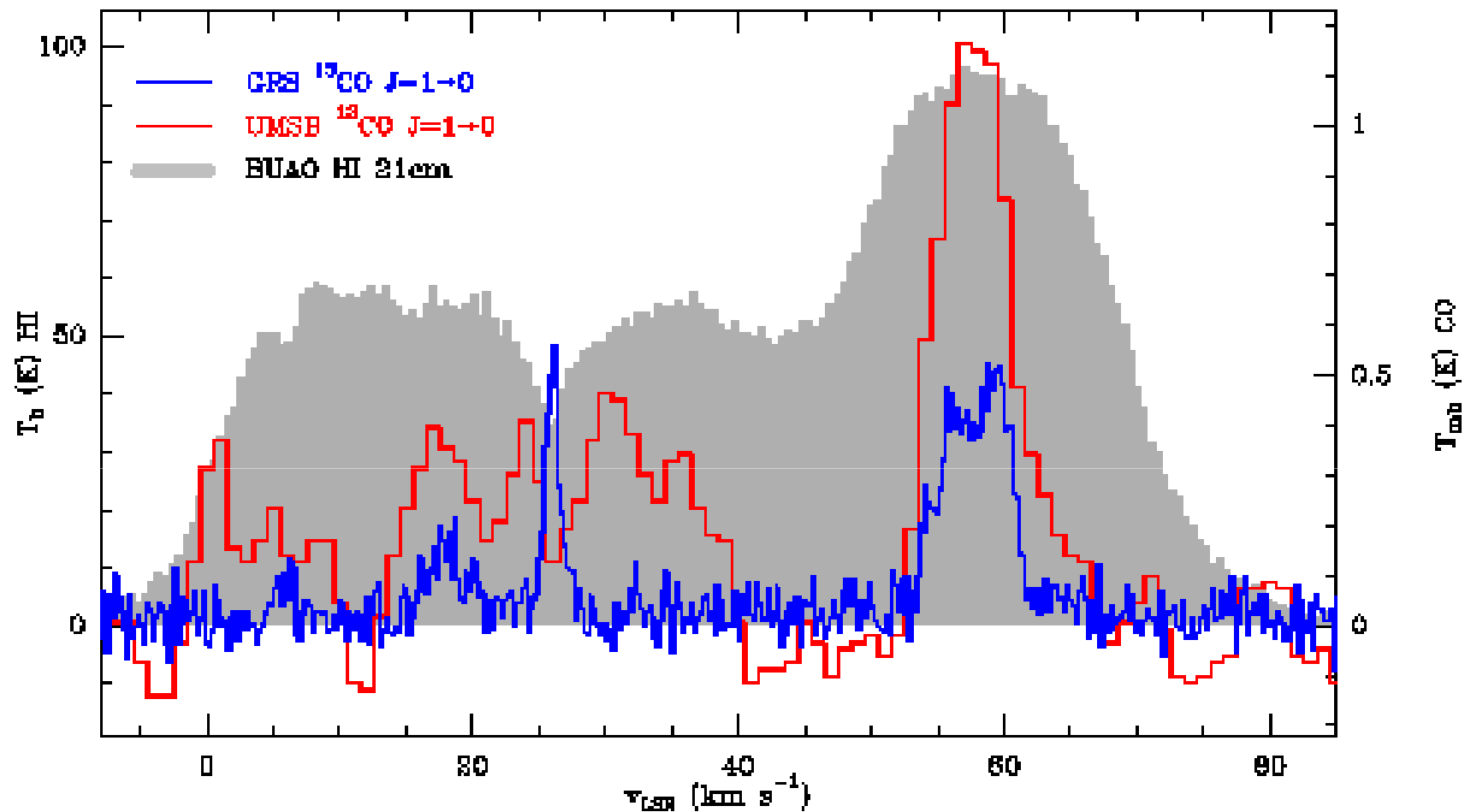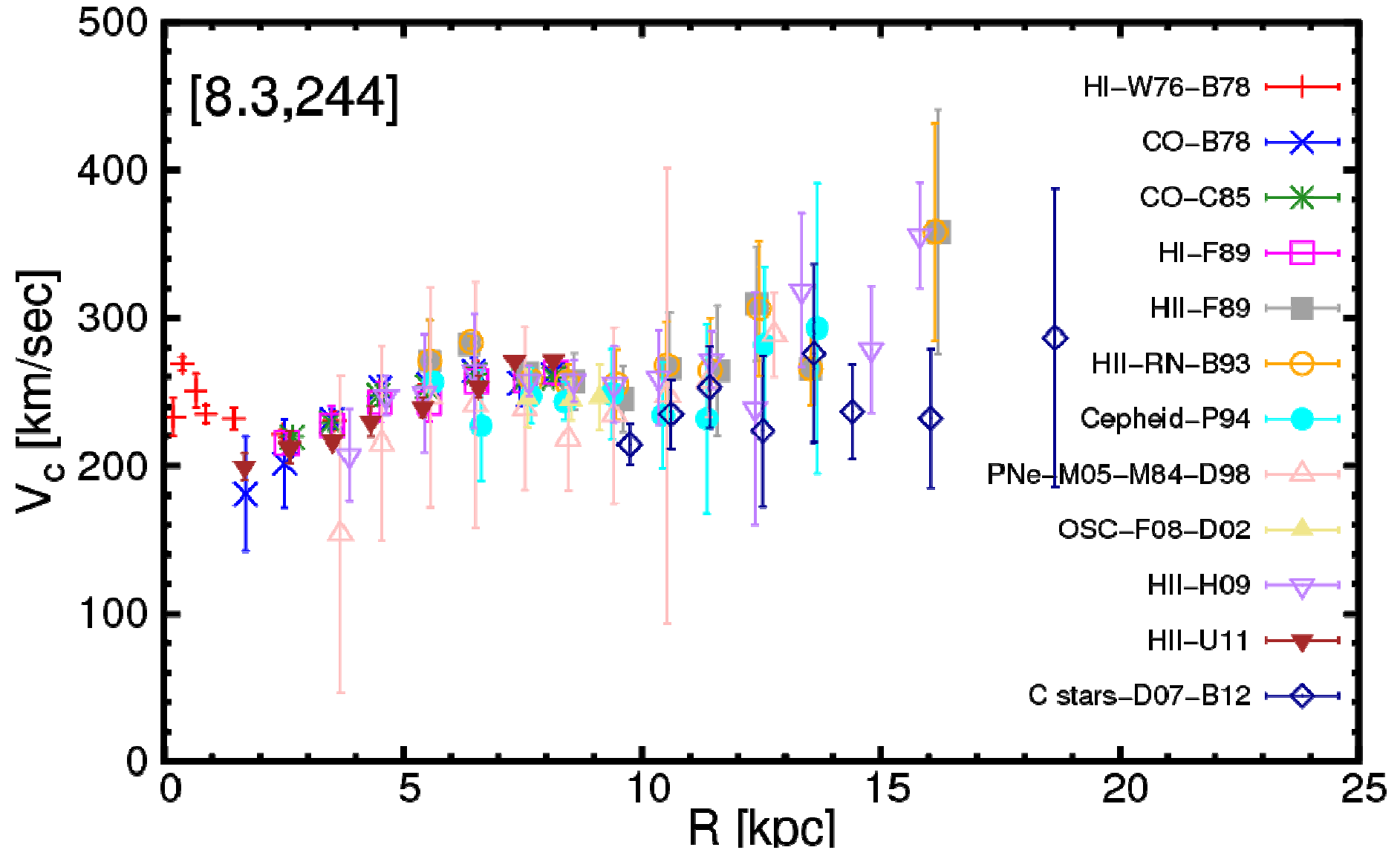*The BU-FCRAO Milky Way Galactic Ring Survey; Simon et al.*

The figure shows H I 21 cm, and 12CO and 13CO emission along a particular sightline through the Galactic plane. The emission with the largest v(LSR)is likely to be close to the tangent point.

Milky Way Rotation Curve

Bhattacharjee et al. (2014, ApJ) (see next slide for source of data)

Different tracers of rotation curve in the disk of the Galaxy, used by Bhattacharjee et al. (2014, ApJ) "Rotation Curve of the Milky Way out to 200 kpc" (a compilation of results from other work)

Tracer Type	Data Source	(l, b) Ranges
HI regions[a] (HI-W76-B78)	Westerhout (1976); Burton & Gordon (1978)	$1° < l < 90°$
CO clouds[a] (CO-B78)	Burton & Gordon (1978)	$9° < l < 82°$
CO clouds[a] (CO-C85)	Clemens (1985)	$13° < l < 86°$
HI regions[a] (HI-F89)	Fich et al. (1989)	$15° < l < 89°$ and $271° < l < 345°$
HII regions (HII-F89)	Fich et al. (1989)	$10° < l < 170°$ and $190° < l < 350°$
HII regions & reflection nebulae (HII-RN-B93)	Brand & Blitz (1993)	$10° < l < 170°$ and $190° < l < 350°$
Cepheids (Cepheid-P94)	Pont et al. (1994)	$10° < l < 170°$ and $190° < l < 350°$; $|b| < 10°$
Planetary nebulae (PNe-M05-M84-D98)	Maciel & Lago (2005); Maciel (1984); Durand et al. (1998)	$15° < l < 345°$; $|b| < 10°$
Open star clusters (OSC-F08-D02)	Frinchaboy & Majewski (2008); Dias et al. (2002)	$10° < l < 170°$ and $190° < l < 350°$; $|b| < 9°$
HII regions (HII-H09)	Hou et al. (2009)	$10° < l < 170°$ and $190° < l < 350°$
HII regions[a] (HII-U11)	Urquhart et al. (2011)	$10° < l < 65°$ and $280° < l < 350°$
C stars (C stars-D07-B12)	Demers & Battinelli (2007); Battinelli et al. (2012)	$54° < l < 150°$; $3° < |b| < 9°$