

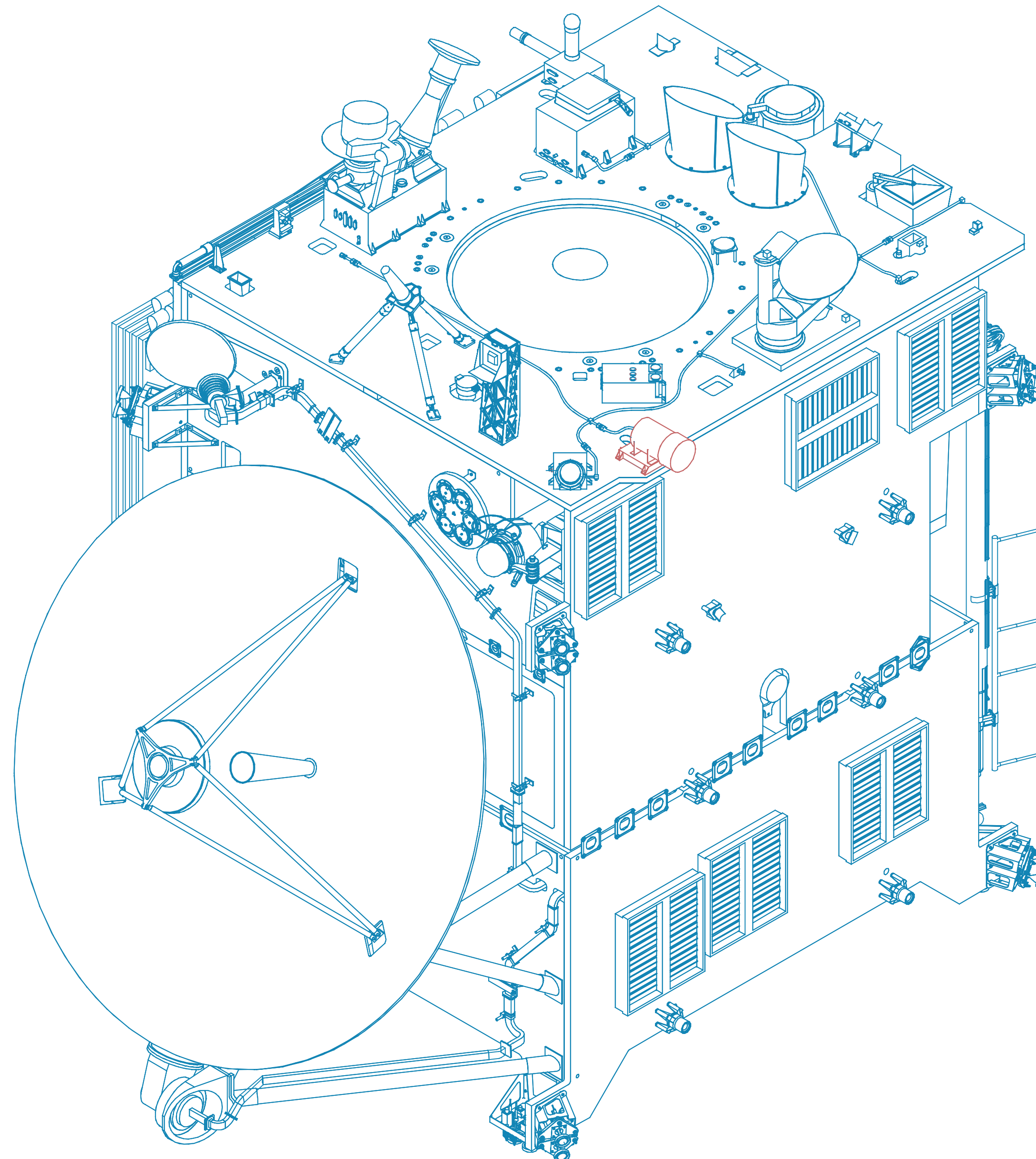
MASS LOADING OF THE SOLAR WIND AT 67P

RPC-ICA

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E
10 eV - 40 keV

(δ, θ)
Field of View : 90x360 °

t
cadence :192 s

M
1, 2, 4, 8, 16 and 32 amu/e

THEORY: MASS LOADING

Convective
electric field

$$\mathbf{E}_{\text{conv}} = -\mathbf{v} \times \mathbf{B}$$

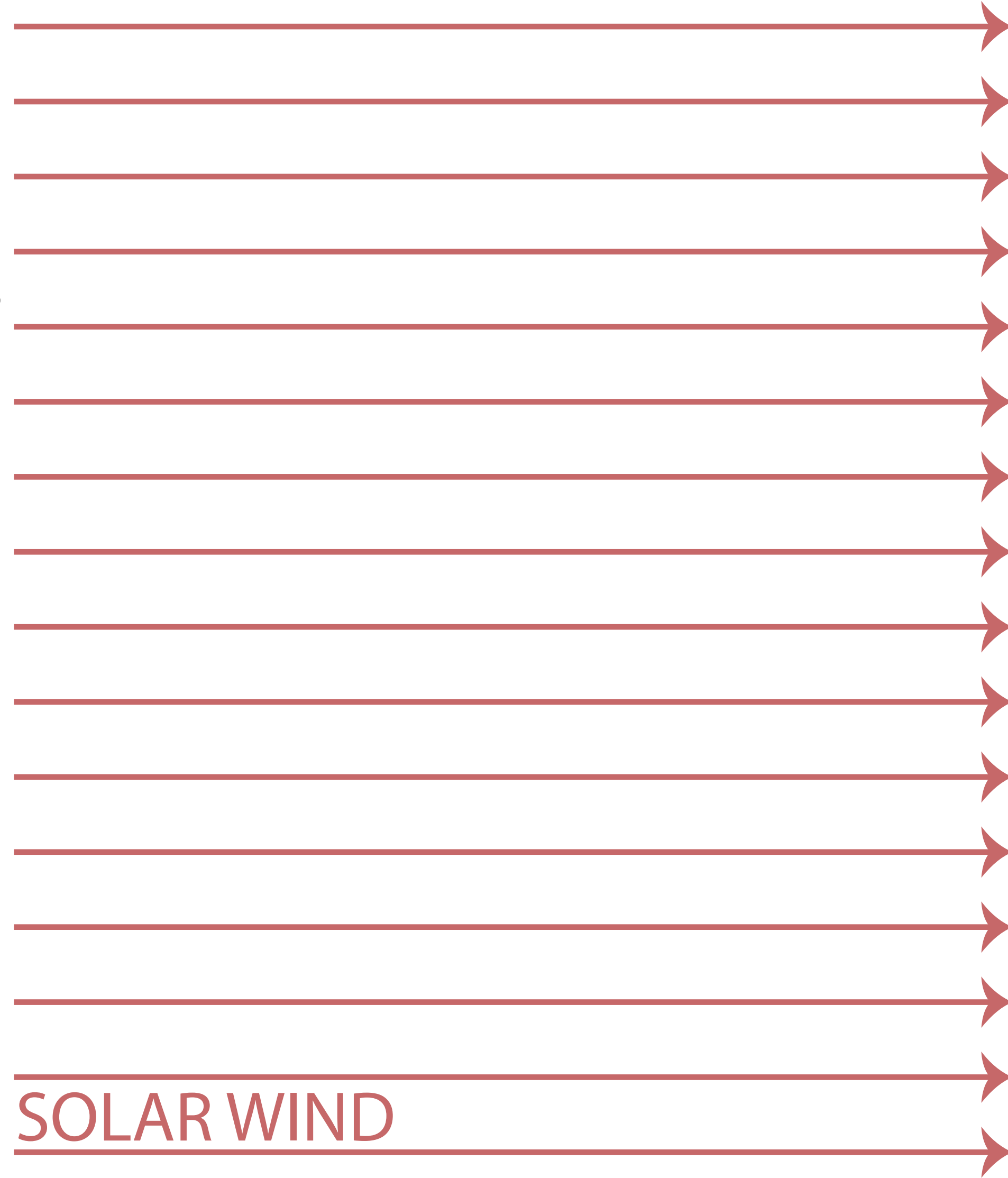
Magnetic field

$\mathbf{B} \odot$

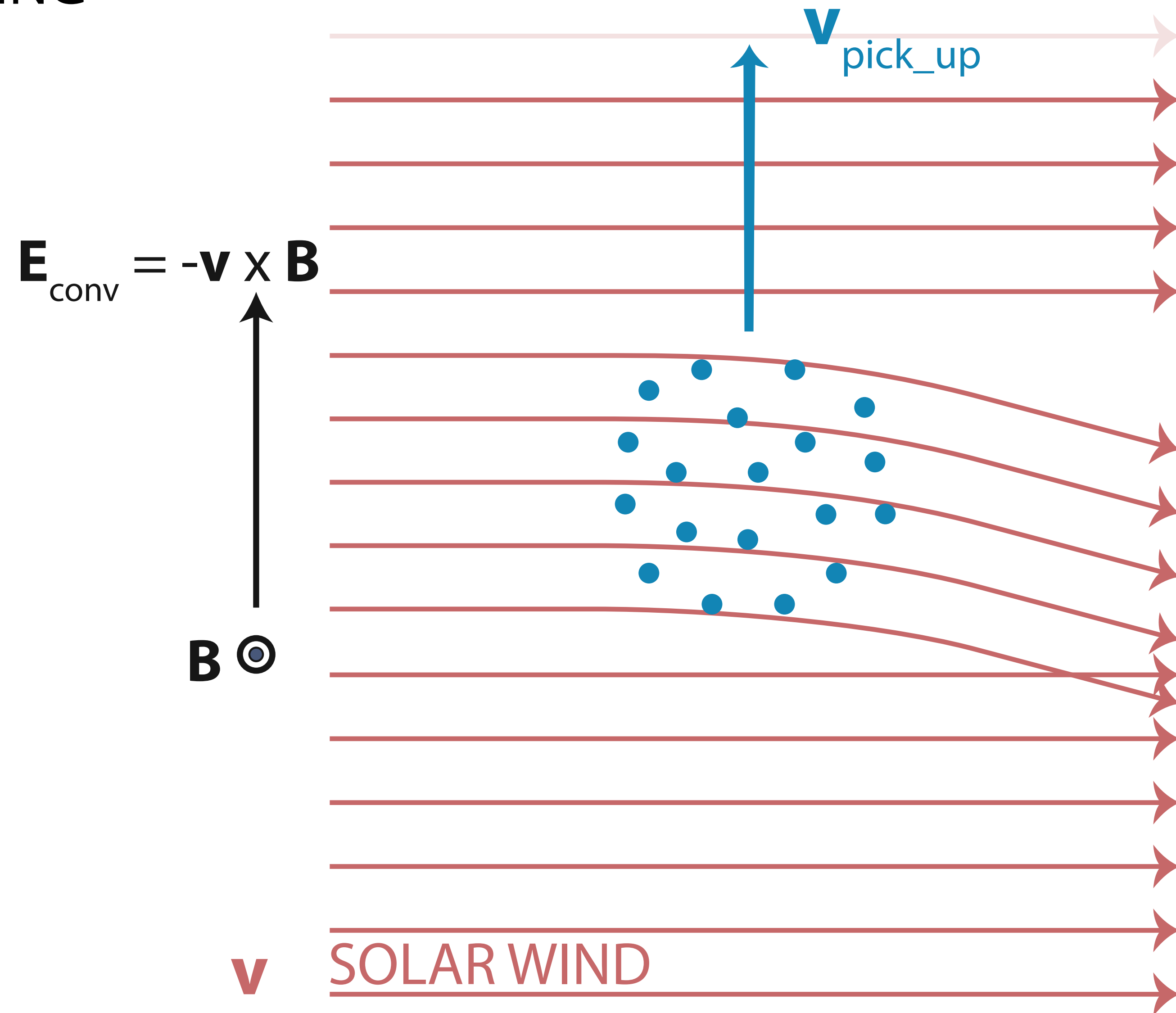
Solar wind velocity

$\mathbf{v}$

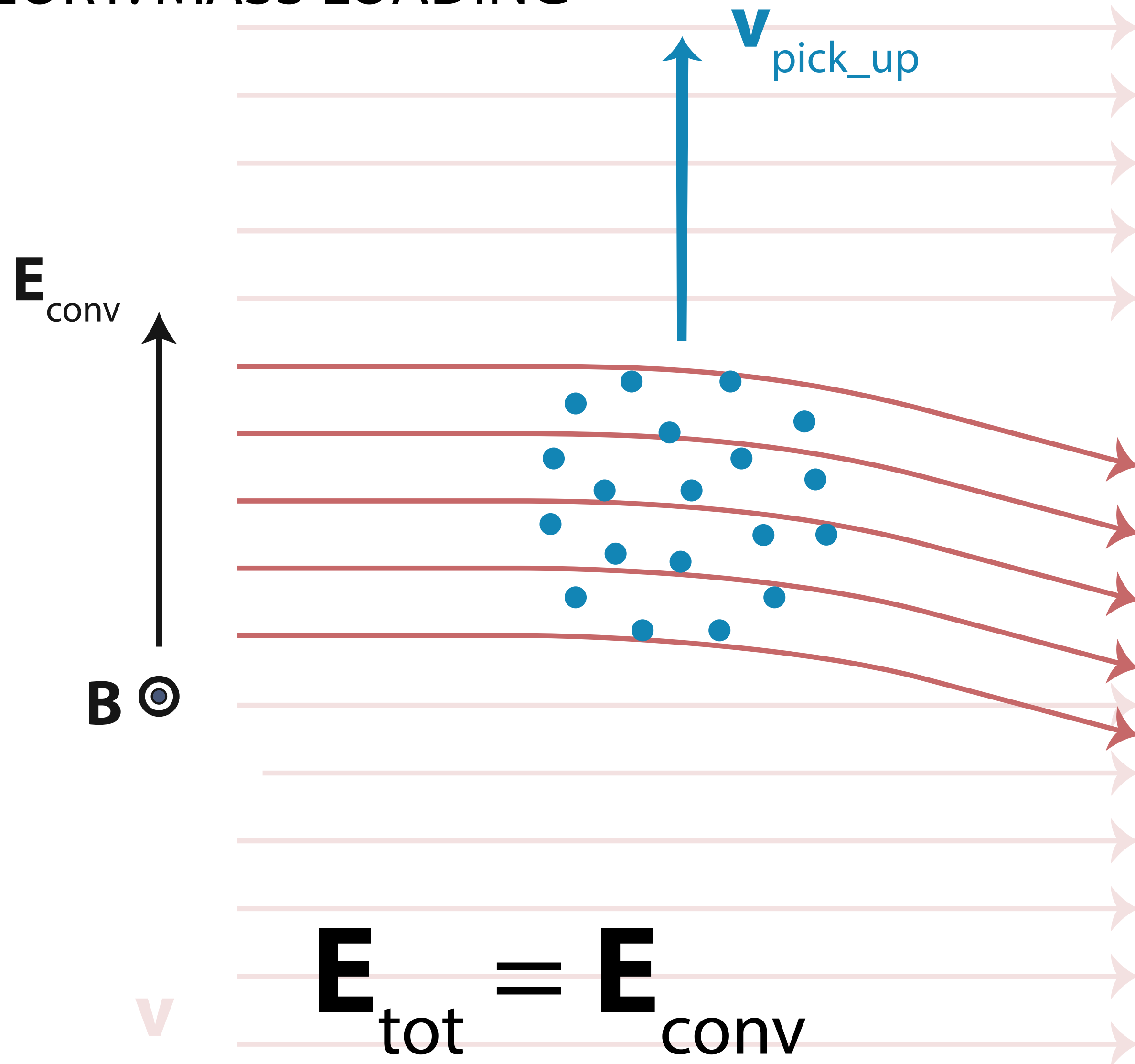
SOLAR WIND



THEORY: MASS LOADING



THEORY: MASS LOADING



THEORY

REALITY

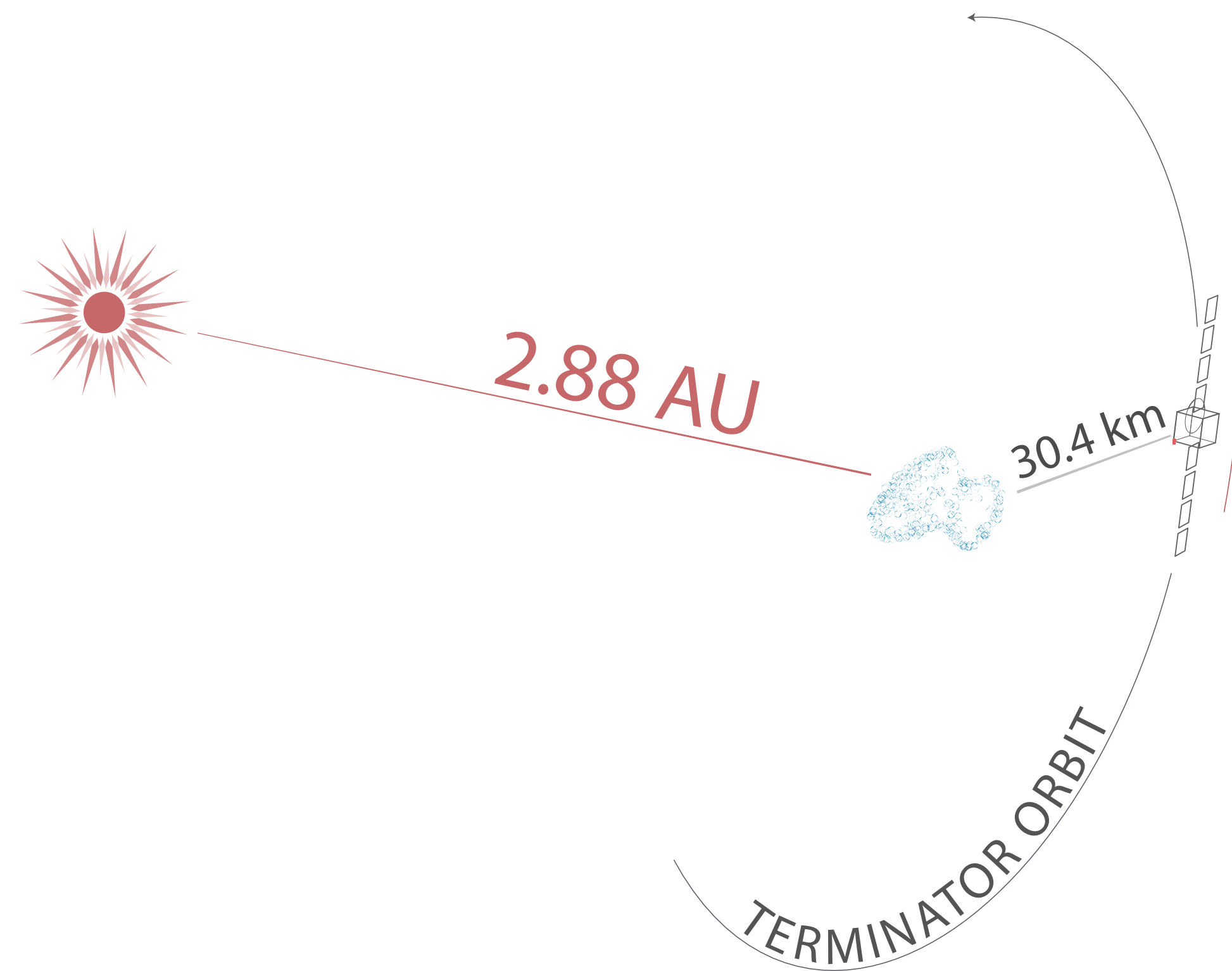
$$\mathbf{E}_{\text{tot}} \nparallel \mathbf{E}_{\text{conv}}$$

$$\mathbf{E}_{\text{tot}} \parallel \mathbf{v}_{\text{pick_up}}$$

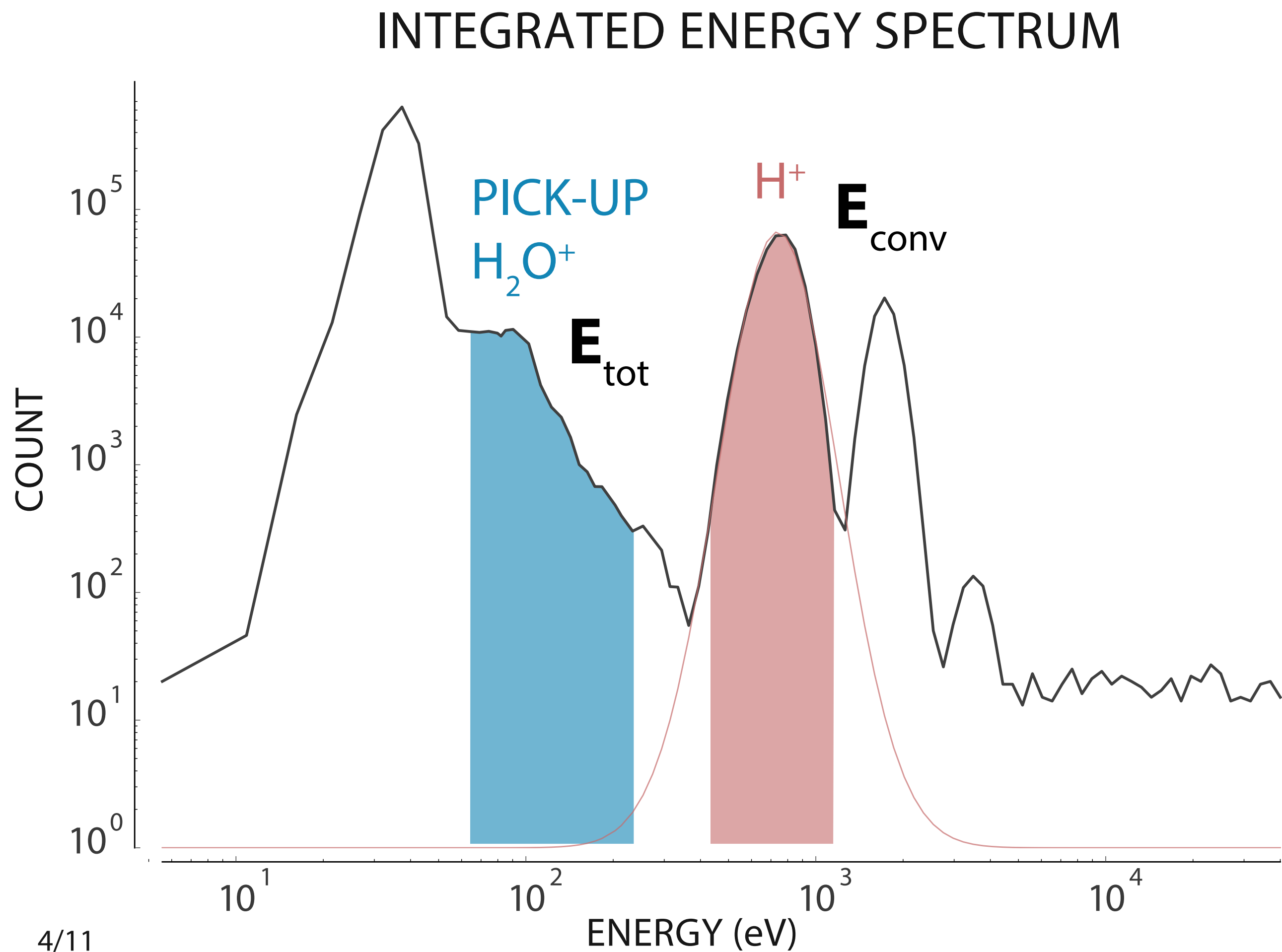
$$\mathbf{E}_{\text{conv}} = -\mathbf{v} \times \mathbf{B}$$

$\mathbf{v}_{\text{pick_up}}$, $\mathbf{v}$, $\mathbf{B}$: measured!

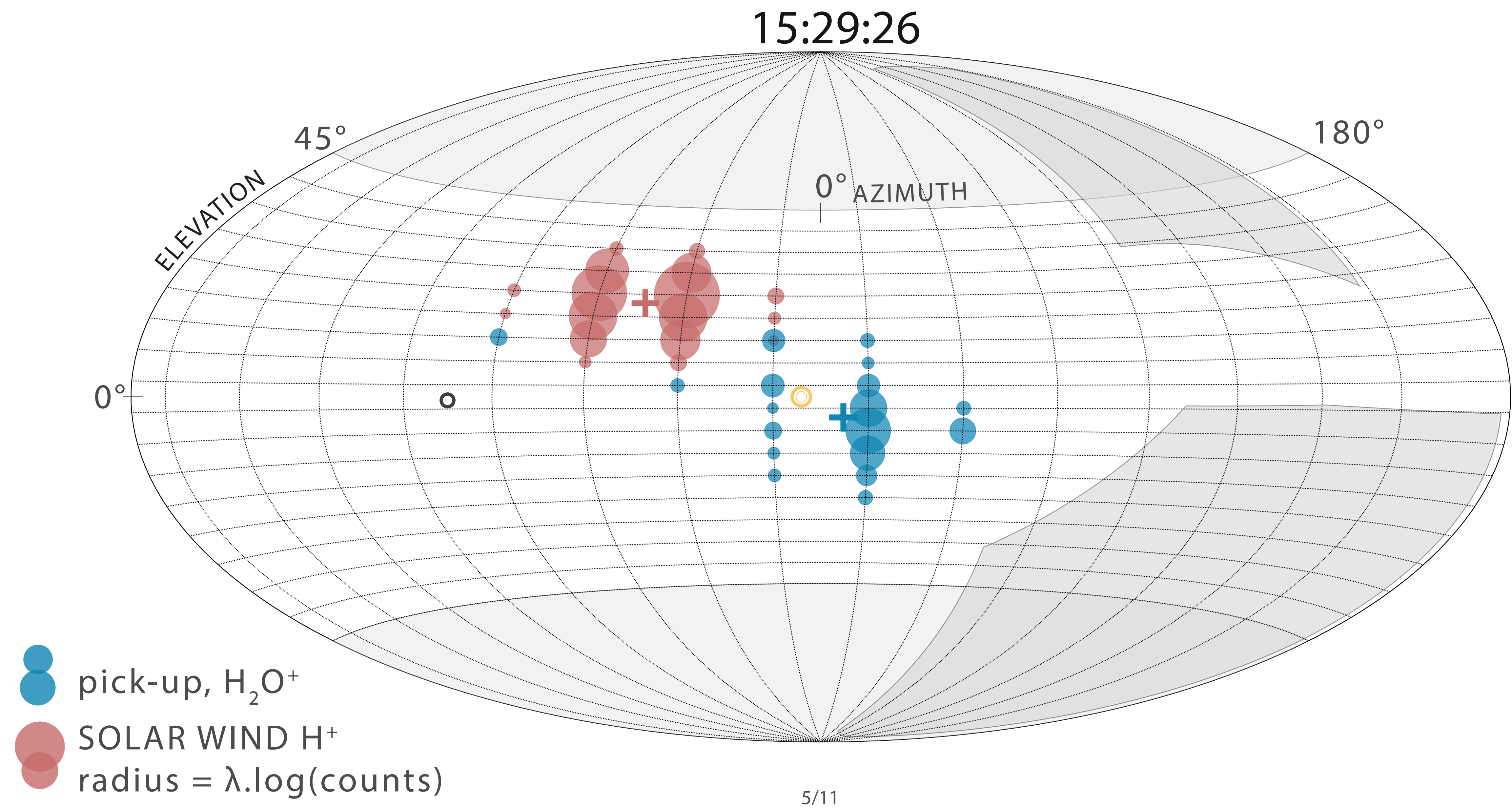
OBSERVATIONS: AN EXAMPLE



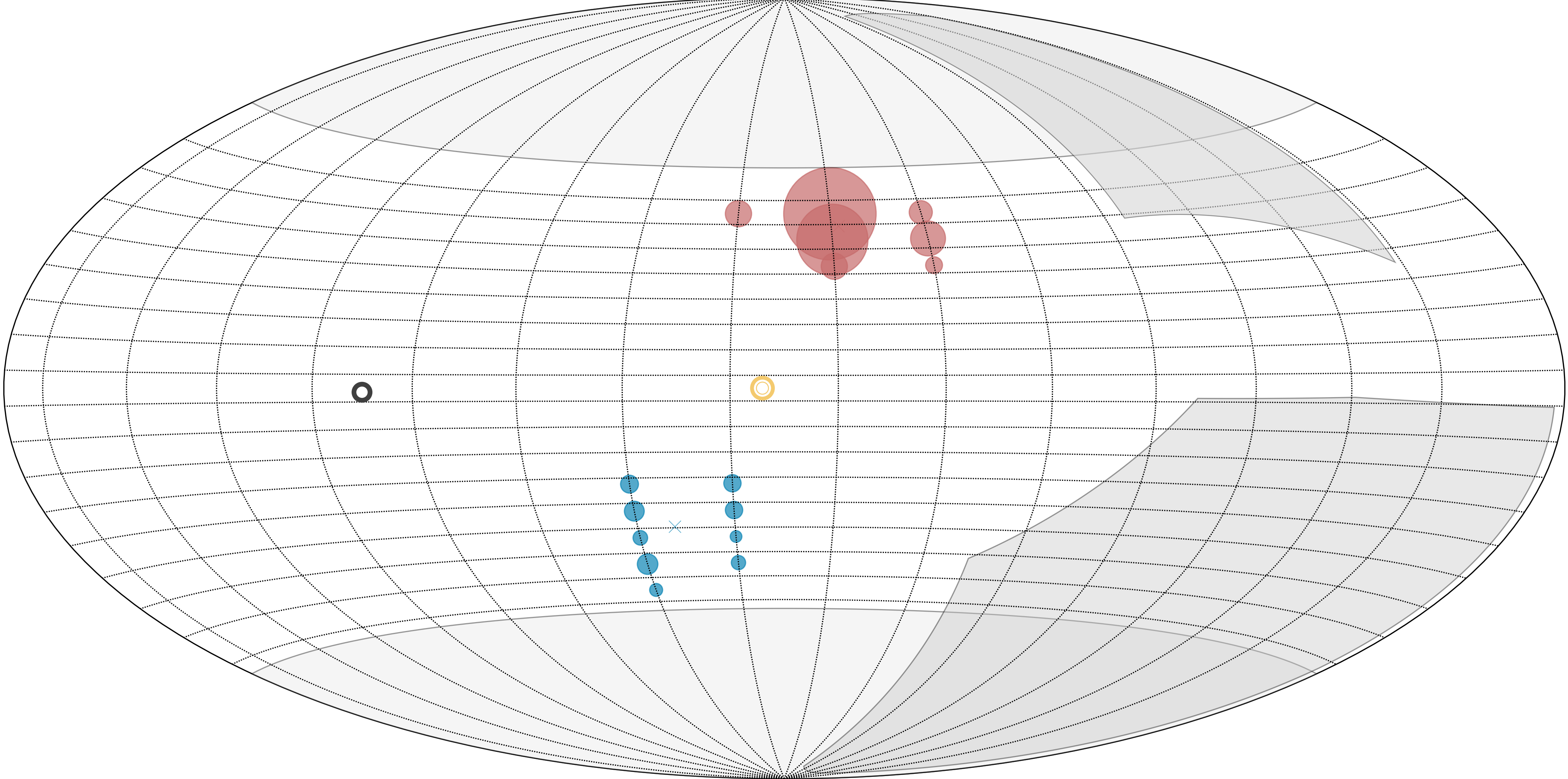
CASE STUDY: 2014-11-28



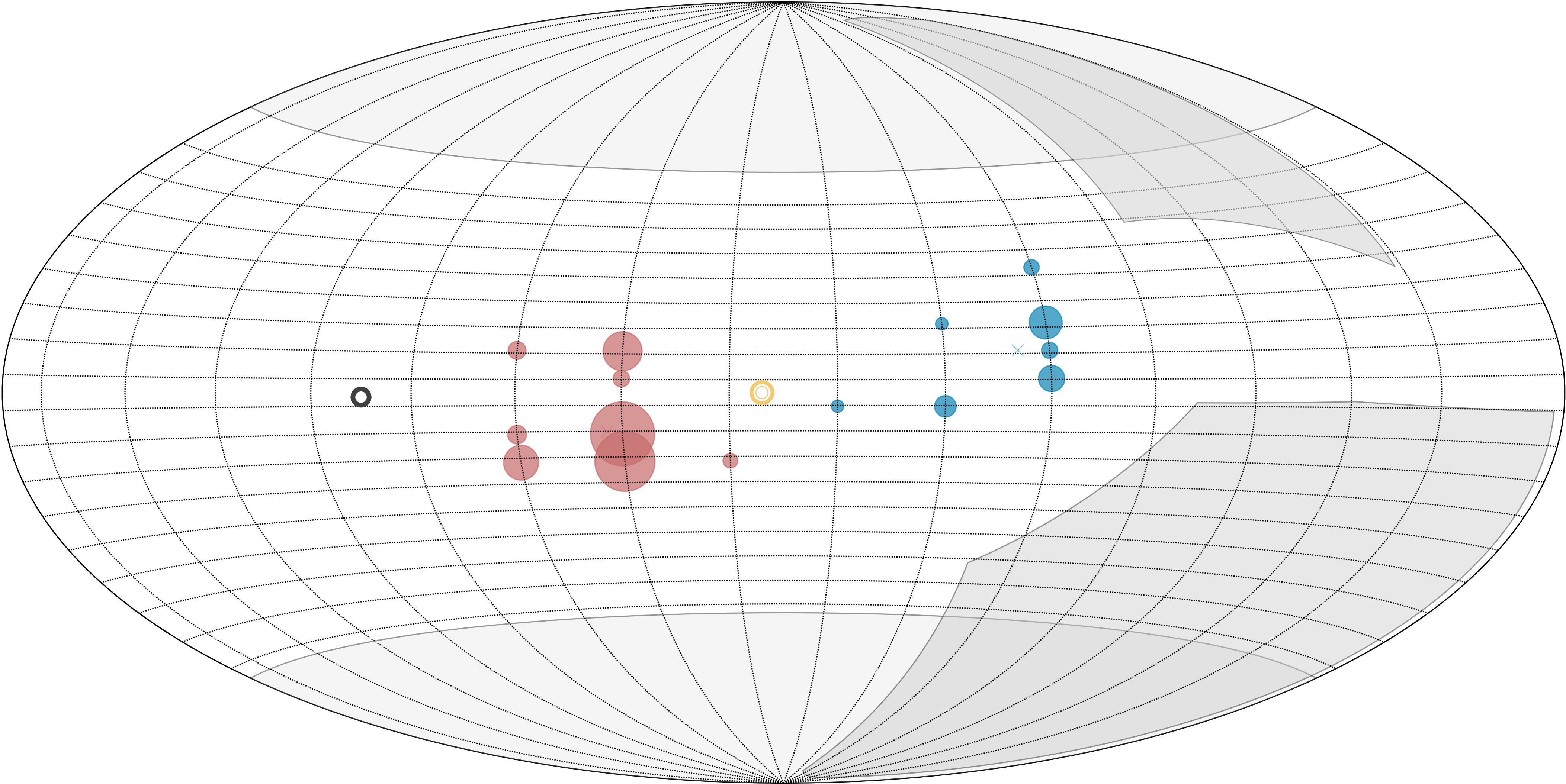
WHAT DO WE SEE ?



16:38:26

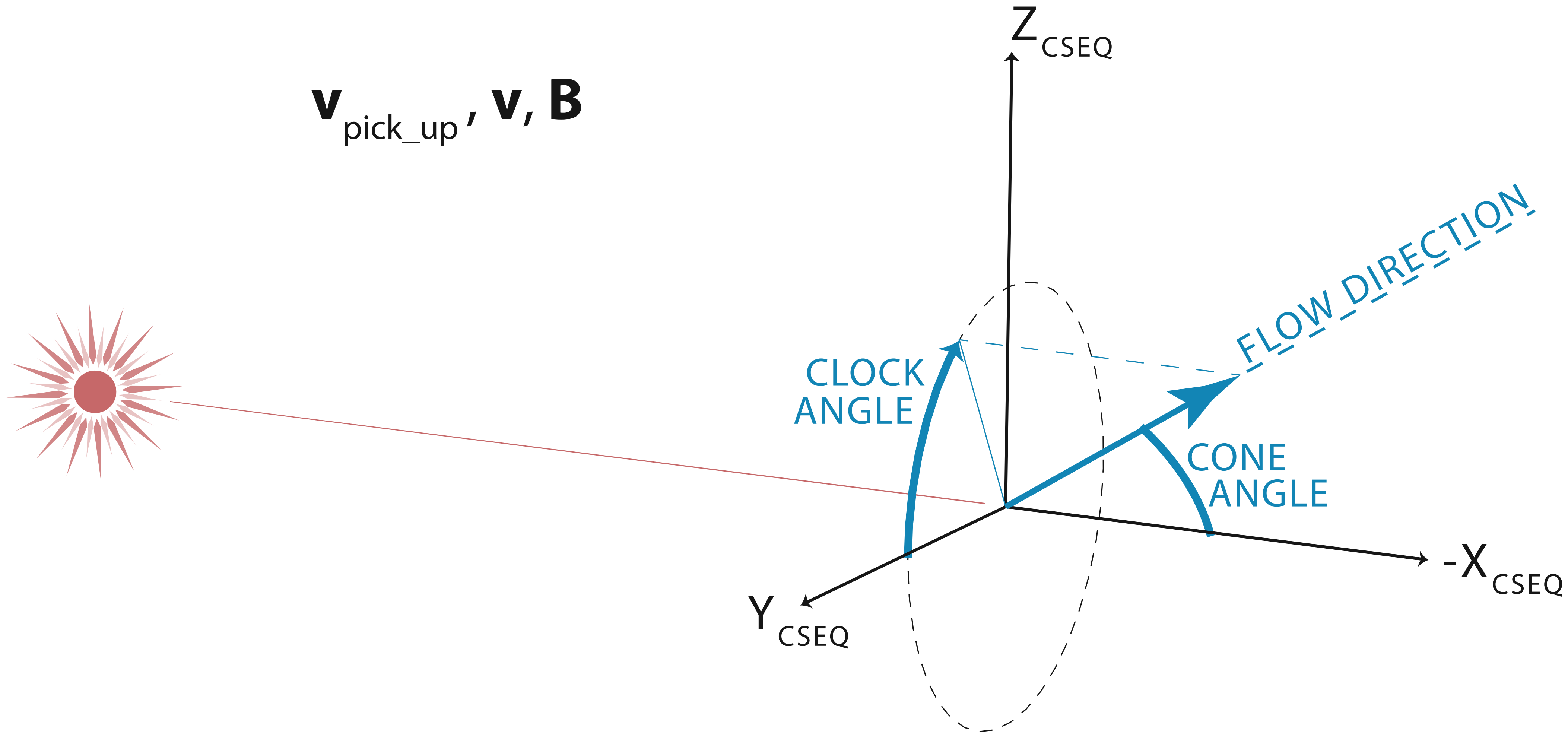


15:15:14

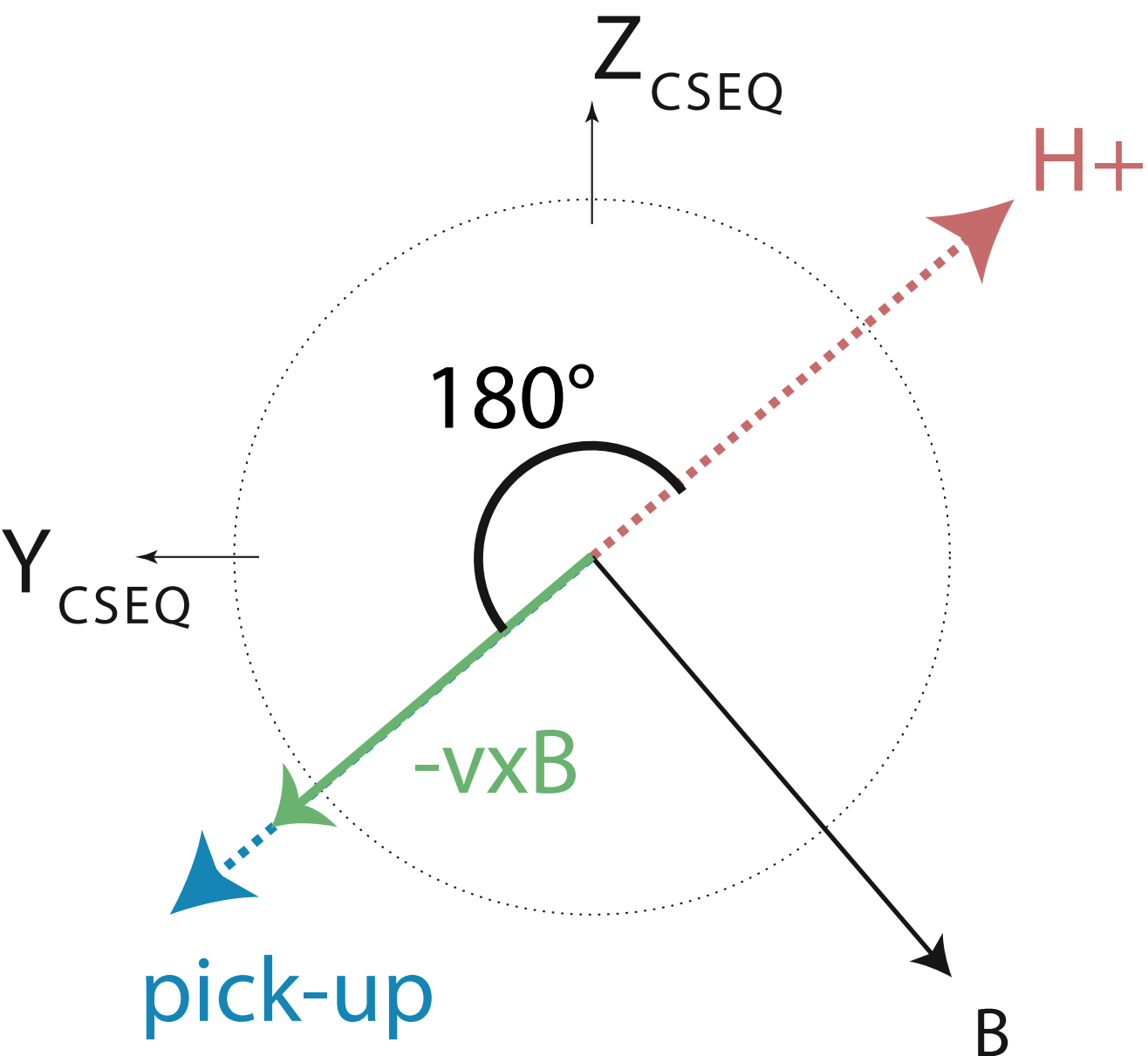
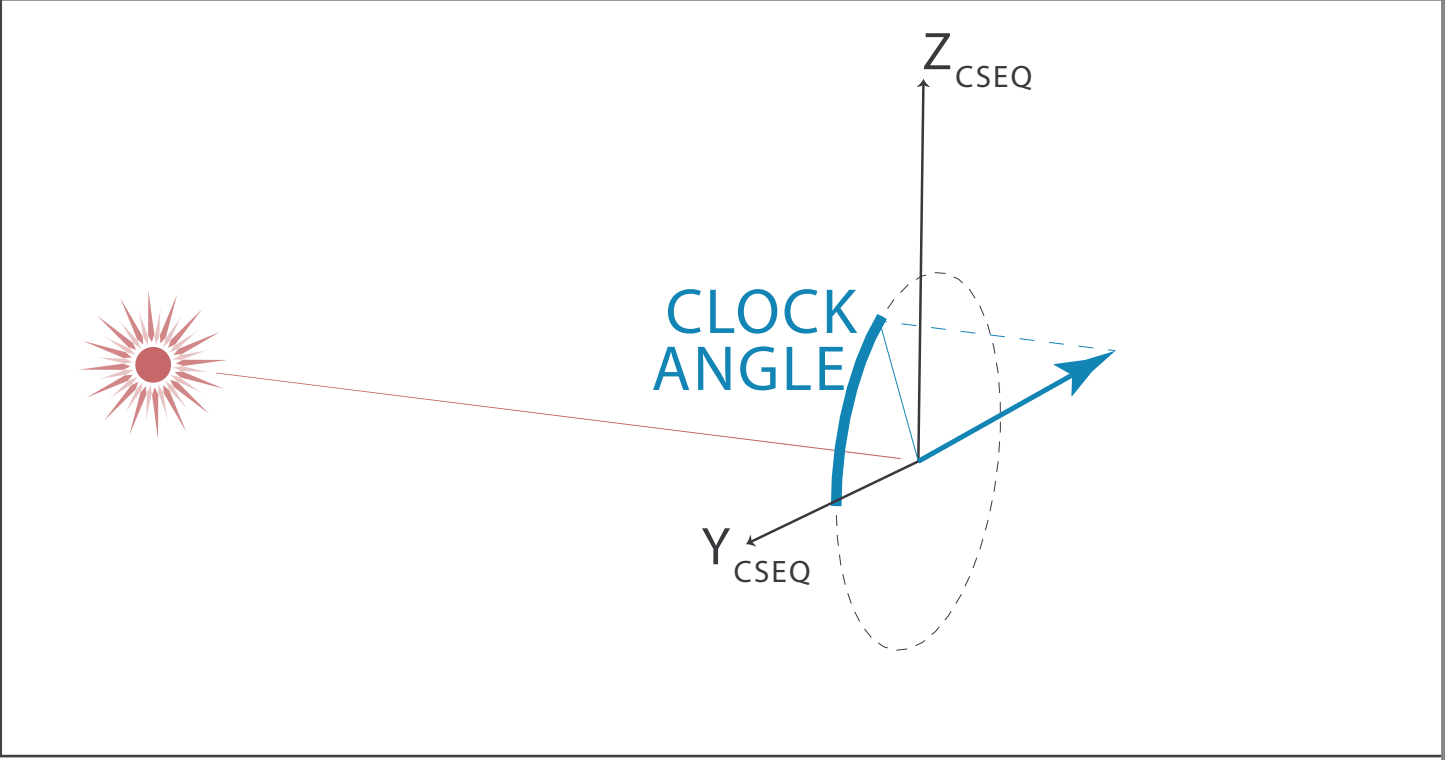
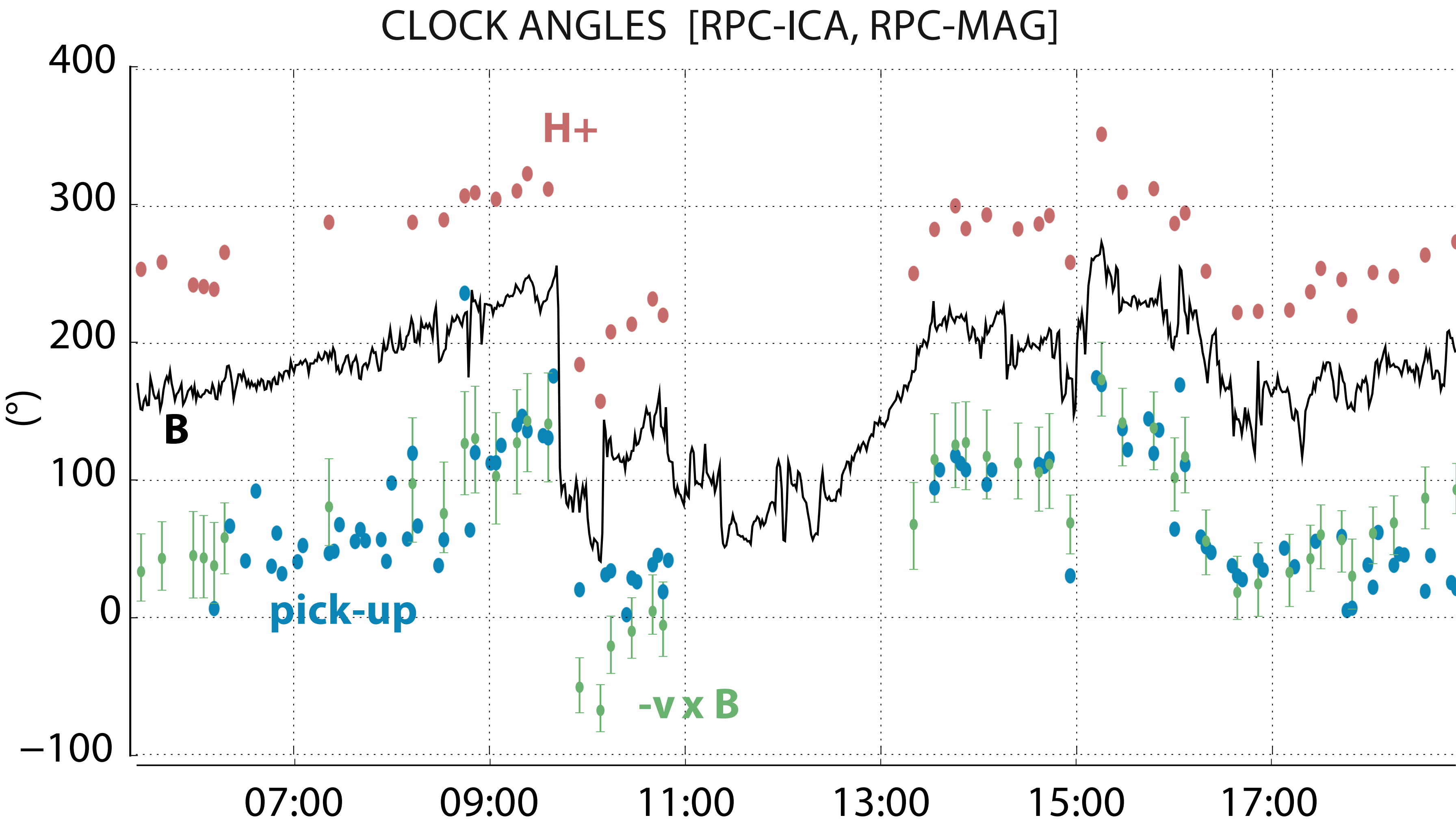


COORDINATE SYSTEM DEFINITION

$\mathbf{v}_{pick_up}, \mathbf{v}, \mathbf{B}$



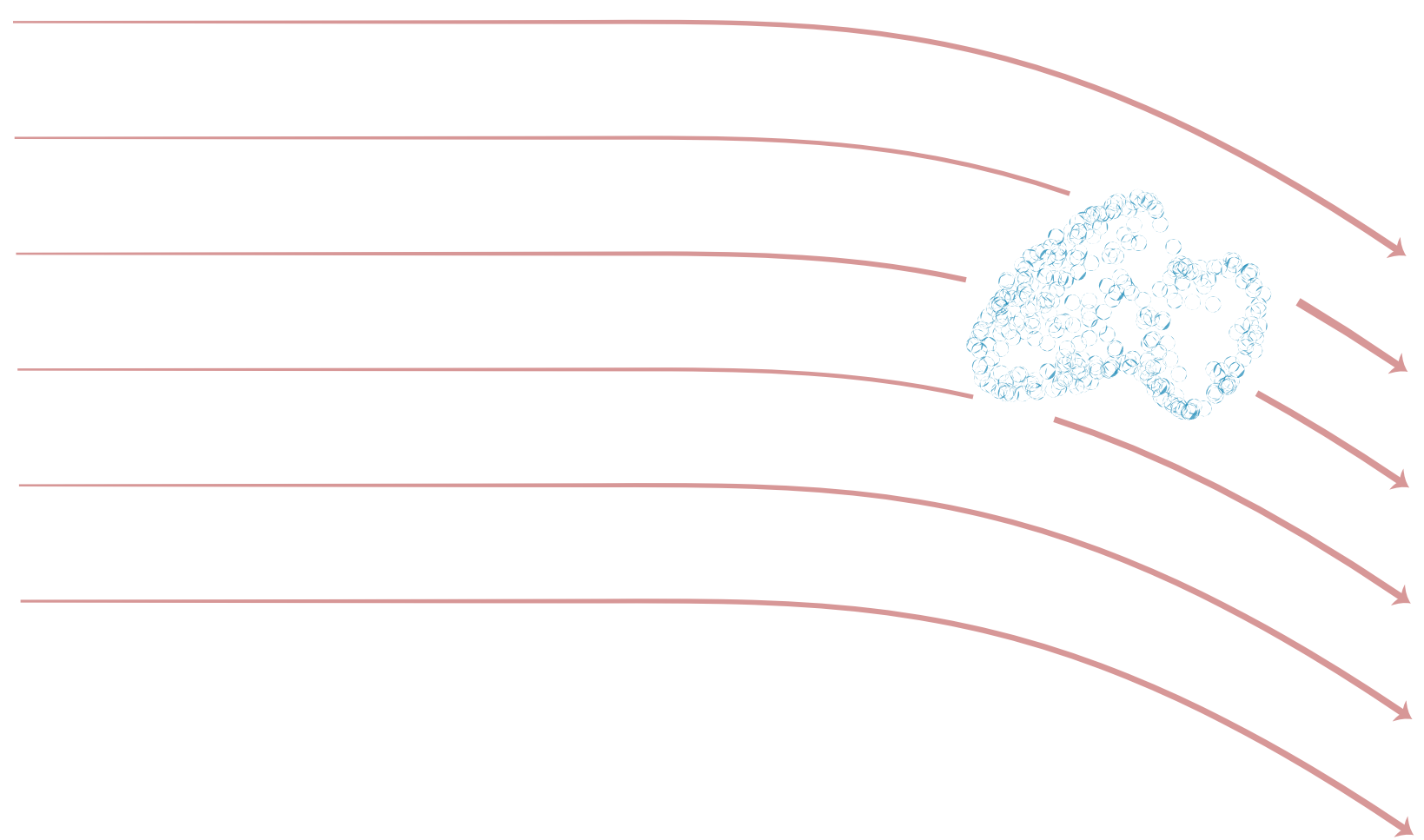
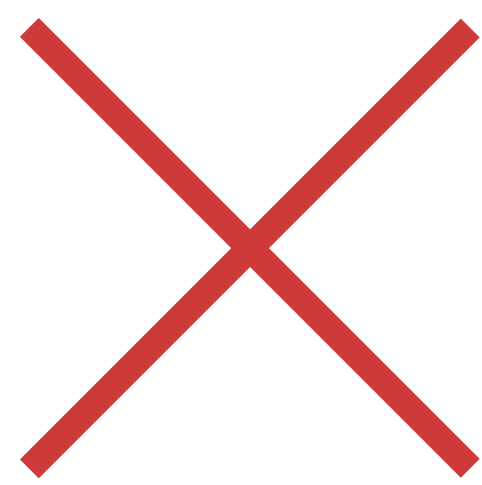
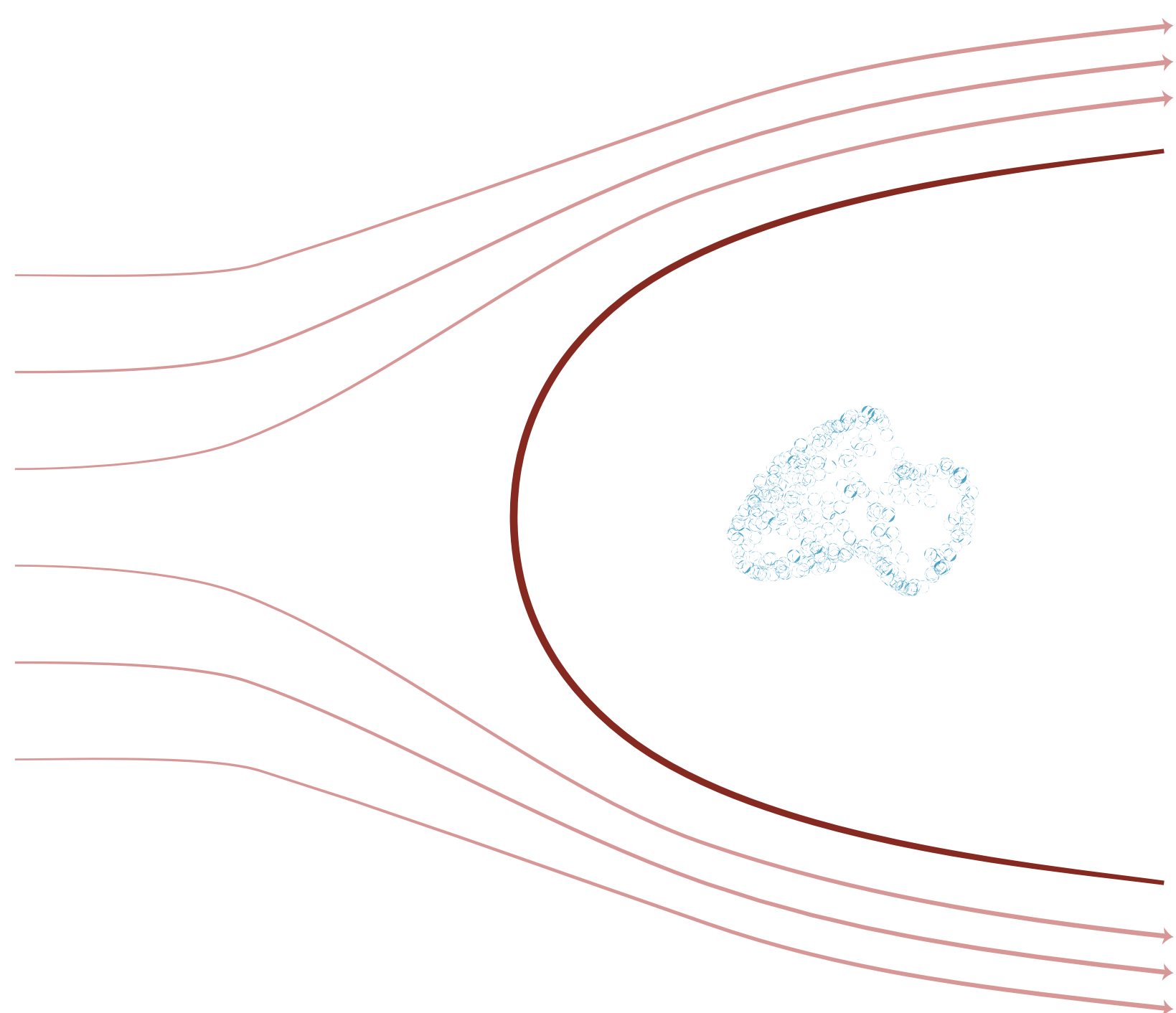
CLOCK ANGLE: RESULTS



$$\mathbf{E}_{\text{tot}} \parallel \mathbf{E}_{\text{conv}} \quad ?$$

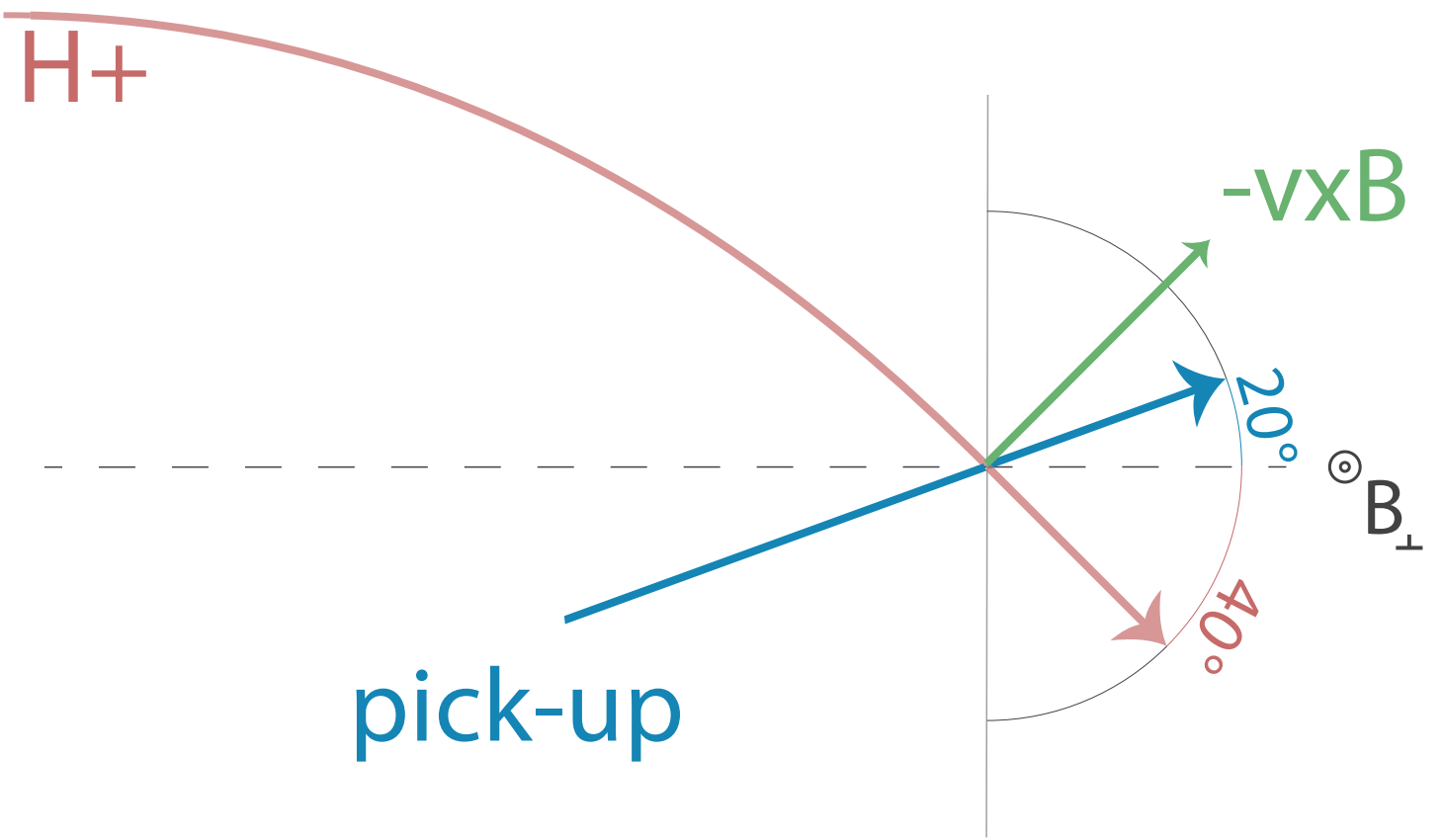
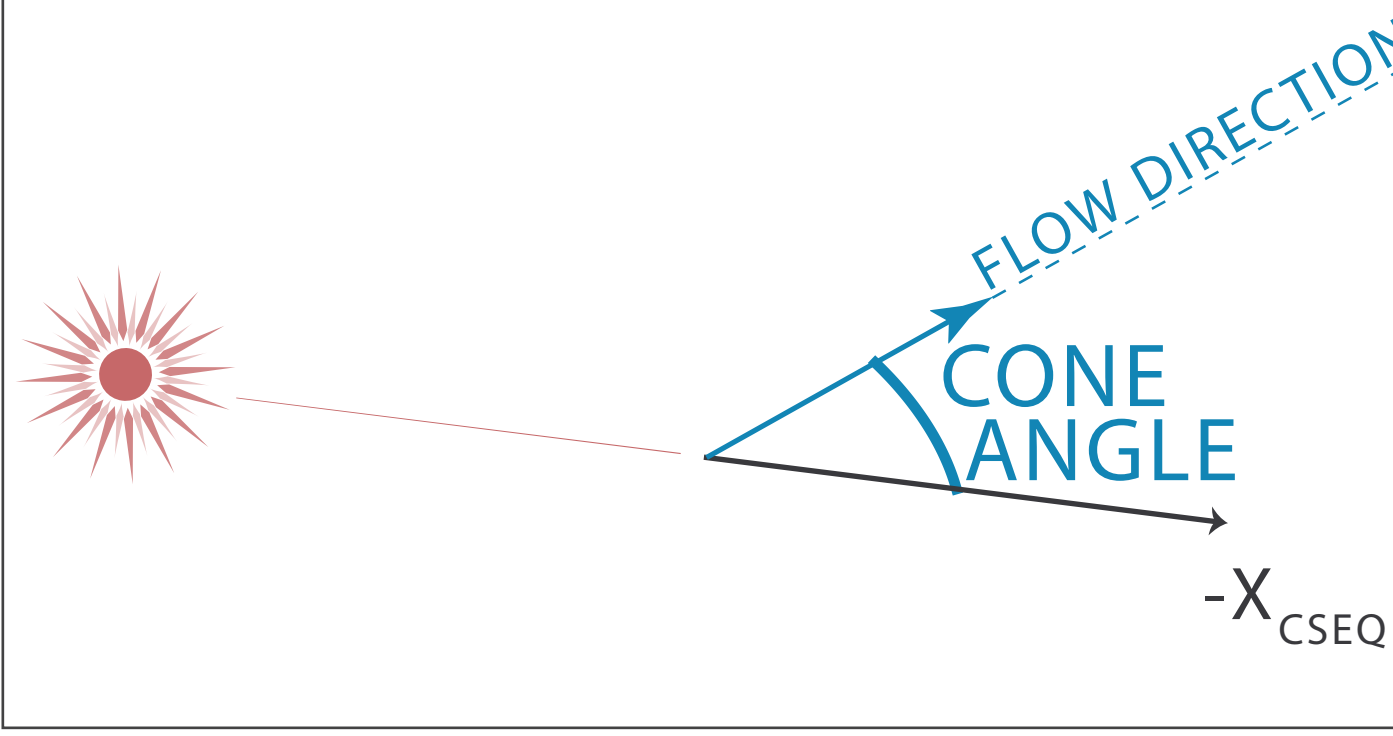
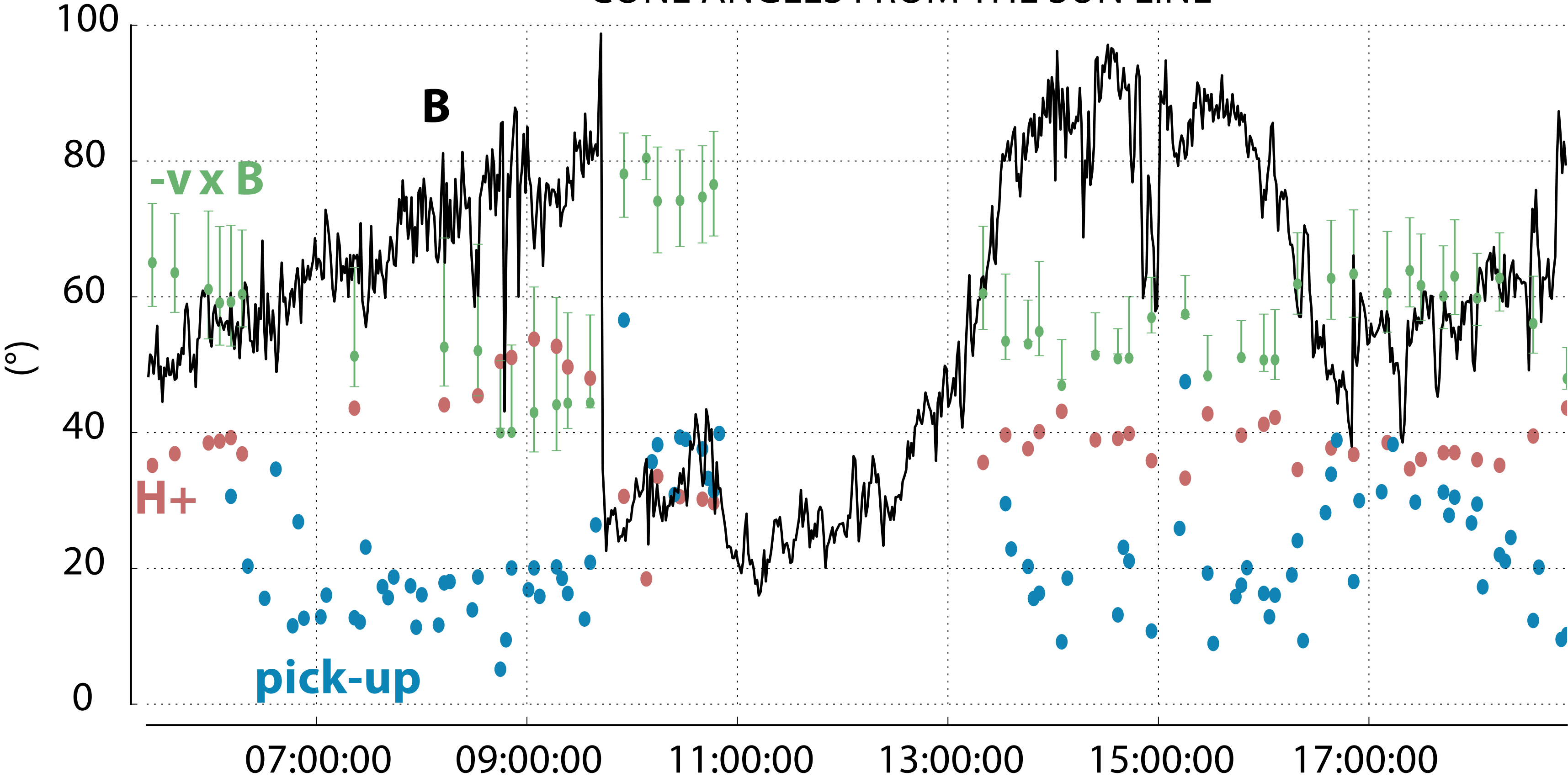
CONCLUSION 1

Not a «rock in a river»

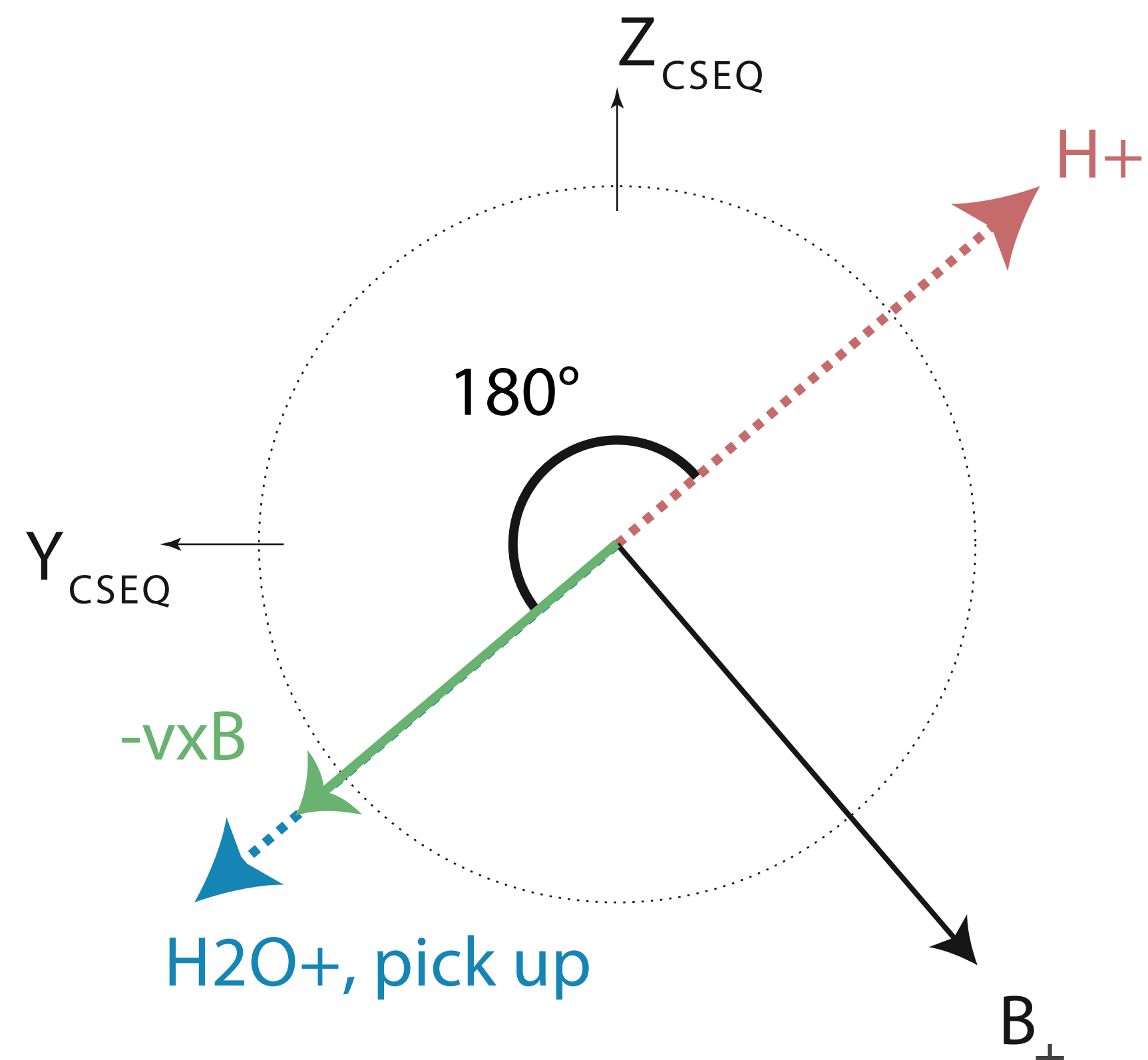


CONE ANGLE: RESULTS

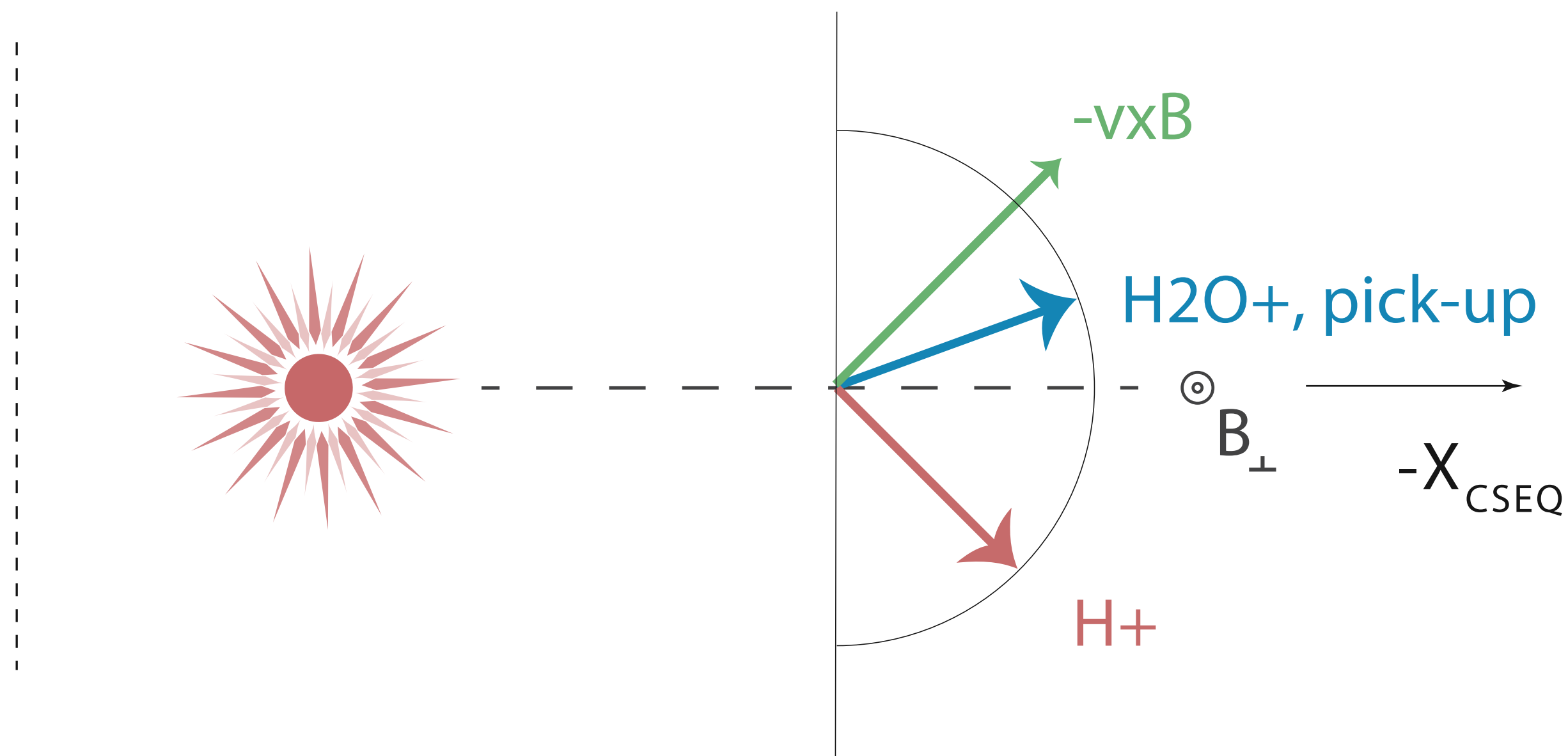
CONE ANGLES FROM THE SUN LINE



CONCLUSION 2



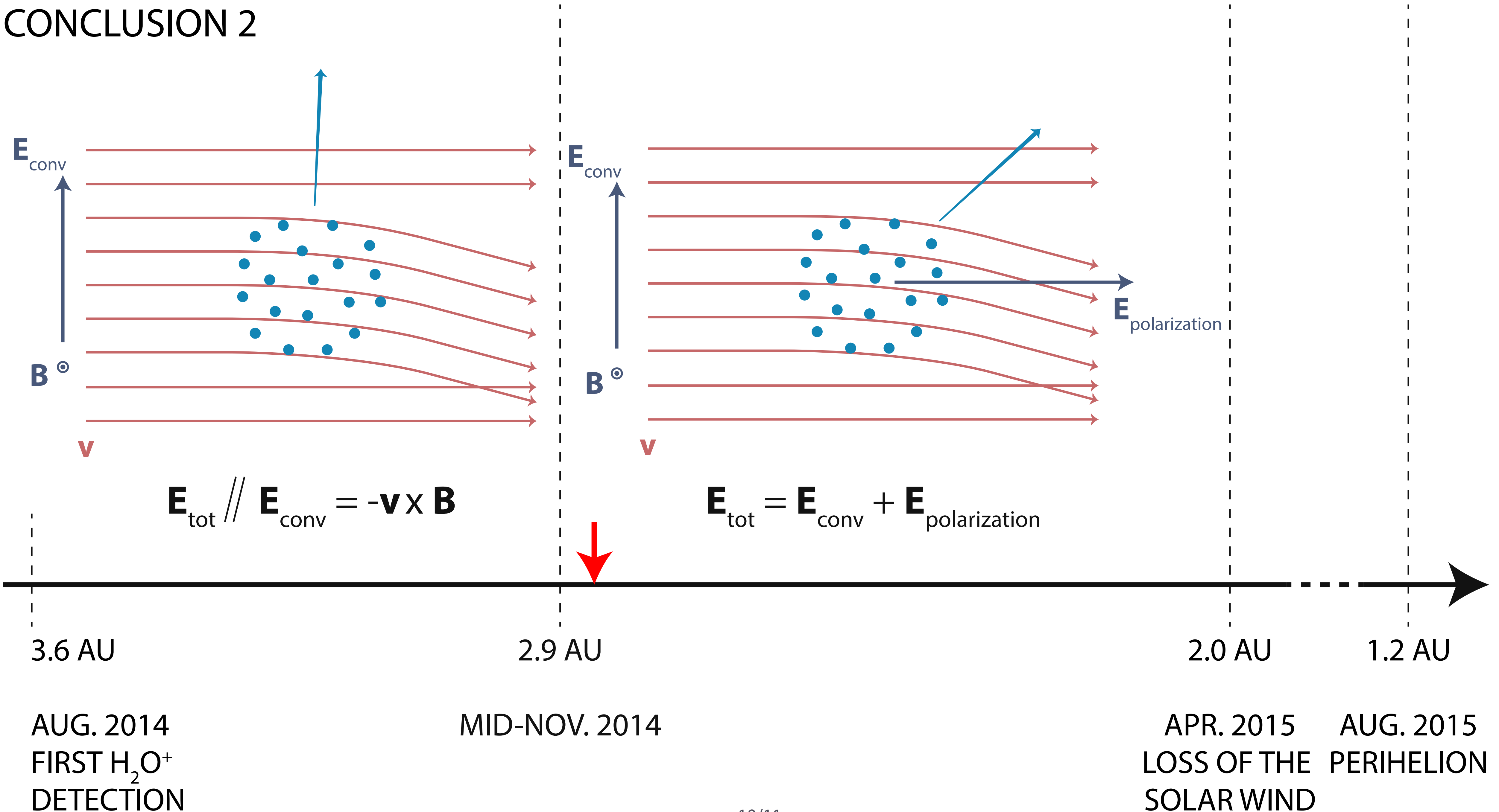
Clock angle



Cone angle

$\mathbf{E}_{\text{tot}} \not\parallel \mathbf{E}_{\text{conv}} = -\mathbf{v}_{H+} \times \mathbf{B}$

CONCLUSION 2



CONCLUSION

- The comet during this early phase does not present a planet-like plasma wake («rock in a river»). The nucleus does not influence consequently the plasma flow.
- At least two regimes appear, separated in time as the activity increases and the distance to the Sun decrease.