



In the above picture:

- $\vec{R}$  denotes the location of the “reference point”. In the code, this is specified by some position, in the simulation domain.
- The location of the reference point (relative to simulation’s origin), the distance  $d$  between the observer and the reference point, and the values of  $\theta_{\text{domain}}$  and  $\phi_{\text{domain}}$  are the only values that affect the orientation of the simulation domain (with respect to the observer).
- $\lambda_{\text{sky}}$  denotes the sky latitude of the reference point (from the observer’s perspective). In the code, this is only considered for purposes of creating correct Mercator projections. (The choice of sky longitude has no effect on the resulting projection, so we simply assume it’s zero - the user can arbitrarily change this later).
- If the reference point is a distance  $d$  from the observer, then in the observer’s reference frame the location of the reference point is at  $(x_{\text{observer}}, y_{\text{observer}}, z_{\text{observer}}) = (d \cos \lambda_{\text{sky}}, 0, d \sin \lambda_{\text{sky}})$