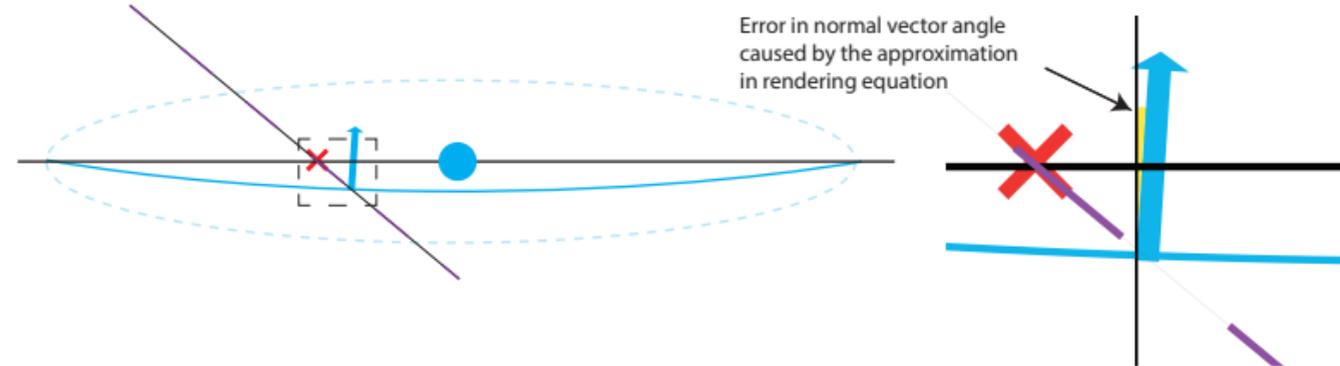


Failure case on computing normal using $n(x)$, or the negative gradient of Gaussian "field"

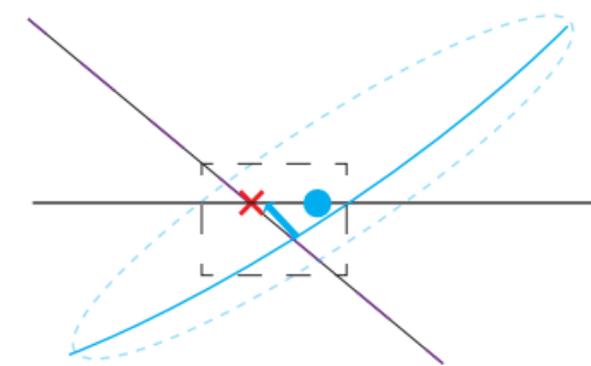
(a)



How our eigenvector for covariance + Eq.(3) for rasterization is a better approximation of the underlying surface normal

(we omit normal rendering for green Gaussian for clearer visualization)

(b)



What can happen if the covariances are free to rotate and not aligned to underlying surface without parameterization using eivenvectors

(we omit normal rendering for green Gaussian for clearer visualization)

(c)



Error in normal vector angle when the covariance orientation is not aligned to surface