I think that it is possible to erase the interference effect in a telescope, or microscope, reducing the Airy disk.

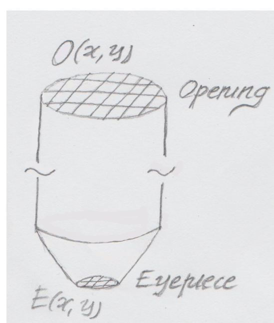
A telescope transform an opening plane wave in an eyepiece plane wave, so that the telescope is a function T on an eyepiece bidimensional signal (that is $\mathbf{E}$ or $E(x,y)\ \forall\ x,y$ in the eyepiece) that give the opening image $\mathbf{O}$.

If there are many input sample images, that have a know outputs (magnification), then the T function can be evaluated: for example this function can be a polynomial function (or each approximation of the telescope function):

$$\mathbf{O} = T(\mathbf{E})$$

$$O(x_l, x_m) = O_{lm} = T_{lm} + \sum_{ijp} T_{lmij} E^p_{ij} + \sum_{ijpq} T_{lmijpq} E^p_{ij} E^q_{lm} + \cdots$$

so that each pixel in the **C**harged-**C**oupled **D**evice is a function of each intensity of the input map (p and q are the powers if the eyepiece fields); the number of parameter is great for a polynomial approximation (in this case, for a disc with 10^3 points, there are $O(10^6)$ parameters), but there are many possible approximation functions (neural nets, Fourier, etc), and there are some with a minimum number of parameters, and there are symmetries of the system (for example each finite rotation of the telescope give the same rotate sample image, reducing the input time).



I think that exist a simple numerical method to obtain the image in the opening using some property of the diffraction functions. If there are two only bright pixels in the image, then the initial energy of the image is:

$$\mathcal{E} = \|p_{ij}\| + \|p_{lm}\|$$

the energy in the eyepiece is:

$$\mathcal{E} = \sum_{rs} \left[P_{ij}(rs) + P_{lm}(rs)\right]^* \left[P_{ij}(rs) + P_{lm}(rs)\right] =$$
$$= \sum_{rs} \left[\|P_{ij}(rs)\| + \|P_{lm}(rs)\| + P^*_{ij}(rs)P_{lm}(rs) + P_{ij}(rs)P^*_{lm}(rs)\right]$$

so that for the conservation of the energy (the single pixel energy $\|p_{ij}\|$ is equal to the energy of the diffraction function $\sum_{rs}\|P_{ij}(rs)\|$):

$$0 = \sum_{rs} P^*_{ij}(rs)P_{lm}(rs) + P_{ij}(rs)P^*_{lm}(rs) =< P_{ij}, P_{lm} >$$

so that if use an orthonormal basis of diffraction function:

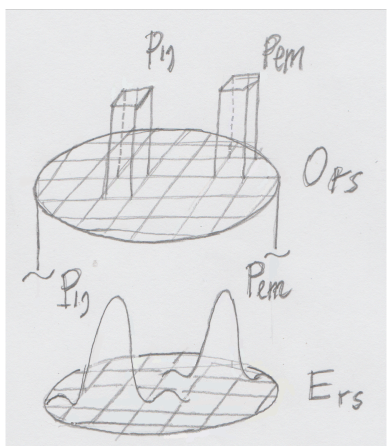
$$\mathcal{P}_{ij} = P_{ij}/\sqrt{2\sum_{rs}\|P_{ij}(rs)\|}$$
$$\mathcal{O}_{ij} = O_{ij}/\sqrt{2\sum_{rs}\|P_{ij}(rs)\|}$$
$$< \mathcal{P}_{ij}, \mathcal{P}_{lm} >= \delta_{ij}\delta_{lm}$$

the initial field pixel on the opening is:

$$\mathcal{O}_{ij} =< \mathcal{P}_{ij}, E >= \sum_{rs}\left[\mathcal{P}^*_{ij}(rs)E(rs) + \mathcal{P}_{ij}(rs)E^*(rs)\right]$$

where $E(rs)$ is the image in the eyepiece, and the scalar product extract the projection on the base element.

The knowledge of the single pixel diffraction function, using a scanner in the opening of the telescope and an image in the eyepiece (a camera that store the amplitude, and phase, of the signal) can give the opening image without diffraction.



In conclusion, a telescope is a bidimensional function between maps, the output map can be corrected to the real map obtained using the magnification of a learning map (a real image placed in front of the telescope).

The same result could be applied to a microscope, using a more precise microscope to correct a reference one, and reducing the energy of the rays that do not destroy the samples.