ERRATA CORRIGENDUM

The Kirchhoff Diffraction Equation based on the Electromagnetic Properties of the Binary Photon by Randy Wayne

Please note errors in Eqns. 77 and 78 on page 42. These equations should be:

Let $v = kaR$ and $u = \zeta \frac{kR}{\pi}$. As a consequence, $\frac{u}{v} = \frac{k\zeta R}{\pi kaR} = \frac{\zeta}{\pi a} = \frac{f}{\pi a} \cong \frac{1}{\pi \csc \sigma} = \frac{\sin \sigma}{\pi} = \frac{n \sin \sigma}{\pi n} = \frac{NA}{\pi n}$, where the cosecant is used to give the correct orientation of the cone of light entering an objective lens.

This change of variables in the object space allows v^{-1} and u^{-1} to represent the lateral and axial distances in the image space, respectively. Thus the ratio of the axial to the lateral distances in the image space is given by:

$$\frac{v}{u} = \frac{u^{-1}}{v^{-1}} = \frac{\pi n}{NA} \tag{77}$$

That is, the axial dimension in the image space of a spherical object will be π times greater than the lateral dimension as a result of the shape of the binary photon and modified by $\frac{n}{NA}$ as a result of the properties of the optical system.

Since in the object space, $\frac{u}{v} = \frac{NA}{\pi n}$, Eqn. (76), which gives the intensity distribution in the image space in terms of the distances represented by v and u in the object space, can thus be rewritten only in terms of v:

$$I_2 = \left| \frac{2ikA_o \cos \beta \;\; ^{ik(r_{o1})}}{4\pi r'_{o1} r'_{12}} \left[\frac{2\pi J_1(v\rho)}{v\rho} \right] \left[\frac{2\pi J_1(v\left[\frac{NA}{\pi n}\right]\kappa)}{v\left[\frac{NA}{\pi n}\right]\kappa} \right] \right|^2 \tag{78}$$