**ABSTRACT**

 In recent years, the surface plasmon wave is widely used for a variety of applications in near-field optics, super-resolution imaging, nanolithography etc due to its shorter effective wavelength and strong field enhancement effects, we numerically study the effect of surface plasmon interference formed by tightly focused radially polarised Bessel Gaussian beams based on the vectorial diffraction theory. Radially polarised Bessel Gaussian beam is tightly focused onto a silver-glass interface with a high numerical aperture oil immersion objective lens.

The two- dimensional (2D) intensity distributions at the silver/air interface are numerically studied. The radial component Er and longitudinal component Ez after the silver/air interface can be expressed as in the diagram. The transverse profiles of the total intensity distributions from the silver/air are measured to show the non-diffracting nature of the beam for different order. Study shows the results for beam order 1 from 0 to 3. For beam order 0 the system generates focal spot , on increasing the beam order the focal spot changes to focal ring.