

The Photon and The Wave

Walter Fox Smith & Marian McKenzie, 3-15-05

(To the tune of “Let’s Call the Whole Thing Off”, by Ira Gershwin)

G Em C D7
Scientific minds, from the lesser to the greater

G Em C D7
Pondered on the mysteries of light and its true nature --

G G7 C I
A particle, a wa-ve, light won’t you just beha-ve?

G C E
Why can’t you make up your mind?

C D7 G
Or are these aspects just intertwined?

G Em C D7
Newton wrote of particles in his great volume “Opticks”,

G Em C D7
Explaining prismic action which had even stumped the Coptics,

G G7 C I
His theory of refraction, it got a great reaction

G C E
From the royal society --

C D7 G
They bought it for a century!

C Bm E Am C D7
But oh – then along came Thomas Young with his two slits!

C Bm E Am C D7
And oh – interference could be clearly seen – the wave was it!

G Em C D7
Then along came Maxwell with a microscopic theory

G Em C D7
A wave of electricity and magnetism, dearie!

G G7 C I
The E field makes the B field, The B field makes the E field

G C E
In a wave that can travel through space --

C D7 G
A triumph of the human race!

G Em C D7
But later in the century, they found a great catastrophe!

G Em C D7
The UV radiation would have no limitation!

G G7 C I
Planck stopped all this doomin' simply by assumin'

G C E
Light was particles of energy --

C D7 G
hbar omega, now don't you see!

C Bm E Am C D7
But oh – what if it is really both at the same time?

C Bm E Am D7
You know – both particle and wave, it would be sublime!

G Em C D7
Einstein got it together – his interests were eclectic!

G Em C D7
He set about explainin' the effect photoelectric.

G G7
He exclaimed with great theatrics,

C I
“Planck’s photons weren’t just math tricks,

G C E
h-bar is the perfect size!”

C D7 G
It led him to a Nobel prize!