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EINSTEIN, Albert
(NAOJ)

In 1906, the patent office promoted Einstein to Technical Examiner Second Class, but he was not giving up on academia. In 1908, he became a privatdozent at the University of Bern. In 1910, he wrote a paper on critical opalescence that described the cumulative effect of light scattered by individual molecules in the atmosphere, i.e. why the sky is blue[1].

$$e = mc^2 \tag{1}$$

During 1909, Einstein published "Uber die Entwicklung unserer Anschauungen uber das Wesen und die Konstitution der Strahlung" ("The Development of Our Views on the Composition and Essence of Radiation"), on the quantization of light. In this and in an earlier 1909 paper, Einstein showed that Max Planck's energy quanta must have well-defined momenta and act in some respects as independent, point-like particles. This paper introduced the photon concept (although the term itself was introduced by Gilbert N. Lewis in 1926) and inspired the notion of wave?particle duality in quantum mechanics.

In 1911, Einstein became an associate professor at the University of Zurich. However, shortly afterward, he accepted a full professorship at the Charles University of Prague. While in Prague, Einstein published a paper about the effects of gravity on light, specifically the gravitational redshift and the gravitational deflection of light. The paper appealed to astronomers to find ways of detecting the deflection during a solar eclipse. German astronomer Erwin Freundlich publicized Einstein's challenge to scientists around the world.

In 1912, Einstein returned to Switzerland to accept a professorship at his alma mater, the ETH. There he met mathematician Marcel Grossmann who introduced him to Riemannian geometry, and at the recommendation of Italian mathematician Tullio Levi-Civita, Einstein began exploring the usefulness of general covariance (essentially the use of tensors) for his gravitational theory. Although for a while Einstein thought that there were problems with that approach, he later returned to it and by late 1915 had published his general theory of relativity in the form that is still used today (Einstein 1915). This theory explains gravitation as distortion of the structure of spacetime by matter, affecting the inertial motion of other matter.

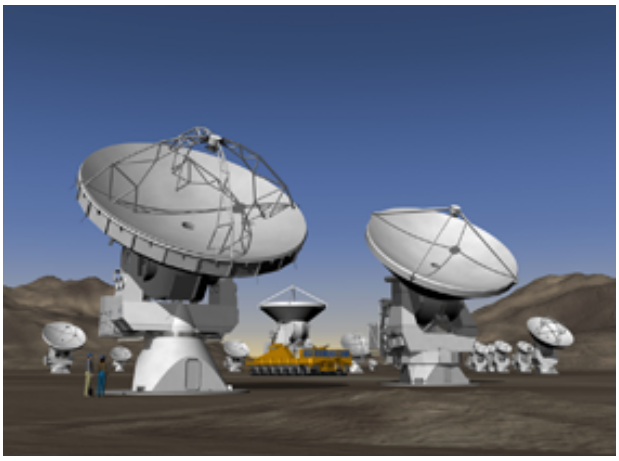

Figure 1:

After many relocations, Mileva established a permanent home with the children in Zurich in 1914, just before the start of World War I. Einstein continued on alone to Berlin, where he became a member of the Prussian Academy of Sciences. As part of the arrangements for his new position, he also became a professor at the University of Berlin, although with a special clause freeing him from most teaching obligations. From 1914 to 1932 he was also director of the Kaiser Wilhelm Institute for Physics.

$$F(\lambda) = \varepsilon_{cont} \left(\frac{\lambda}{10\mu m} \right)^{-1.6} B(T_{cont}, \lambda) \times e^{-\tau_{9.7} \times k(\lambda)} \tag{2}$$

Einstein's research after general relativity consisted primarily of a long series of attempts to generalize his theory of gravitation in order to unify and simplify the fundamental laws of physics, particularly gravitation and electromagnetism. In 1950, he described this "Unified Field Theory" in a Scientific American article entitled "On the Generalized Theory of Gravitation"

References

[1] Smith, B. A., Terrile, R. J.: 1984, *Science*, **226**, 1421.