Aharonov's contributions to physics did not end with the Aharonov–Bohm effect. That was followed by many further brilliant discoveries, of which I will describe two. An object in space, unconnected to any other, looks the same after one complete turn. If the object is tied by a rope, its turn is registered as a twist in the rope. The surprise comes after two turns: then the rope can be untwisted, and again the tethered object looks the same as before. You can perform this trick with your own hands (I learned recently that it is now accepted as a 't'ai chi' exercise). In 1967, Aharonov (with Leonard Susskind) took seriously a fact that had been noted before but dismissed as insignificant, that the distinction between tethered and untethered rotations persists into the microscopic world. In particular, some quantum particles behave as though they are linked to the rest of the world by ghastly strings, and look different after one complete turn: their waves change sign, and return to their original state only after two turns. They suggested an experiment with neutrinos to detect this bizarre effect, and in 1975 it was seen by two groups of investigators.

The second discovery concerned the 'geometric phase'. This occurs in quantum systems that undergo a sequence of changes in a cycle, so as to return to their original state. After the cycle, the waves that describe the system depend on the geometry of the cycle. This shift is the geometric phase. Its existence as a general phenomenon—with the Aharonov–Bohm and Aharonov–Susskind effects as special cases—had been demonstrated already, but only under the restriction that the cycle be performed slowly. In 1987, Aharonov (working with Jeeva Anandan) removed this restriction, and gave a more general, and rather simple, formulation of the geometric phase.

Imagining Aharonov arriving in the Bristol of 1957—not the most exciting city at that time, I am informed—on his first trip abroad. According to rumour, he was embarrassed by his Israeli accent, but thought it would be a handicap in pursuing the natural enthusiasm of a young man, so he took elocution lessons out his new voice, the person he addressed replied in Hebrew.

Back to physics, then, and a spectacular discovery with Bohm, in 1959, that now bears their name. It concerns an aspect of the microscopic behaviour of quantum particles that contrasts dramatically with that of the same particles in the 'classical' mechanics of Newton (which applies on larger scales). The Aharonov–Bohm effect is the ability of charged quantum particles, for example, electrons, to respond to electric and magnetic fields remote from them; classical particles can respond only to fields where they are. Dr (later Professor) Bob Chambers, then himself recently arrived in Bristol, carried out an elegant experiment, helped by a suggestion by Professor (now Sir) Charles Frank, and the Aharonov–Bohm effect was observed, as a shift in the pattern of fringes of interfering electron waves.

Their discovery caused an immediate sensation in the world of physics, as an apparently paradoxical but experimentally confirmed prediction of quantum theory. Over the years its importance has grown as its ramifications have emerged in one area of physics after another: molecules, atoms, solids and, most fundamentally, as a cornerstone of the 'gauge theories' that now dominate the physics of elementary particles.

After leaving Bristol with his PhD, Aharonov held several temporary appointments in the USA before accepting a chair at the University of South Carolina in 1966 and a chair at the University of Tel Aviv in 1957. Two chairs? Only a quantum mechanic could occupy two wave describing the electron changes sign, and this gets reflected in the spectrum of the molecule. Now, it turns out (with the benefit of hindsight) that this too is a geometric phase, mathematically similar to the Aharonov–Susskind effect for neutrinos. So, two geometric phases were discovered in Bristol at the same time (two out of seven over the years, actually). There is no evidence that the connection was appreciated then.

Theoretical physics is a strange calling. You dream and scribble and, if you are lucky, the world conforms. Popperists would argue that if the world does not conform you are lucky, because then you are surprised and so learn more. I am sure, however, that most of us would be more than happy to be lucky as often as Aharonov has been, rather than luckier.

Mr Vice-Chancellor, I present to you Yakir Aharonov as eminently worthy of the degree of Doctor of Science, honoris causa.