

PHYSICS

Ali Hani Chamseddine, Physics Department, American University of Beirut, Beirut, Lebanon, shared the TWAS Prize in Physics:

for his inventions of ten-dimensional supergravity and its interactions; the minimal supergravity standard model; and the spectral action principle in noncommutative geometry.

Ali Hani Chamseddine can claim a direct link to TWAS – his PhD thesis advisor was none other than TWAS's founding father, Abdus Salam. Indeed Chamseddine went on to carry out postdoctoral research at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, where TWAS is hosted.

He returned to Lebanon in 1977, but civil war caused him to emigrate. So, in 1980, he joined the European Organization for Nuclear Research (CERN)



in Geneva, Switzerland. It was there where he did his work inventing ten-dimensional supergravity and its interactions. Years later, this theory was identified as the low energy limit of the superstring.

Following four years in the USA, where he collaborated on the widely cited minimal supergravity standard model of particle physics (SUGRA), he took the opportunity of a lull in the civil war to return to Lebanon. But the ceasefire was short lived and he was forced to leave again, this time to Zurich, Switzerland, where he stayed for more than 10 years. During this period, he invented higher dimensional topological theories of gravity and developed applications of noncommutative geometry to theoretical physics. In 1996 he started a collaboration that still goes on with the Field Medalist and the inventor of noncommutative geometry, Alain Connes. Their first major contribution was the spectral action principle, which is now finding many applications. In particular Chamseddine and Connes have proposed a model that unifies all fundamental interactions, including gravity.

In 1998, he returned to the American University of Beirut as professor of physics and the founding director of the newly established Centre for Advanced Mathematical Sciences. Under Chamesddine's leadership, the centre has quickly become the leading institute of mathematical sciences in the Arabic Middle East.