Editorial

Rajaram Nityananda, Chief Editor

This issue of *Resonance* features Kenneth Wilson, whose work and impact belong to the last one-third of the 20th century. He stands out for proposing and implementing a new method of analyzing the consequences of known physical laws, rather than proposing new ones. In the process, he introduced a far-reaching parallel between two branches of physics which had not only been viewed as different but even opposed to each other. These were the physics of condensed matter and that of elementary particles. True, he was not the first and not alone in making the connection. In both cases, the really interesting problems occur when we have a large number of degrees of freedom, interacting with each other. But it is fair to say that before Wilson, real progress was made in limiting cases where one could identify entities which interact weakly with each other. For example, electrons in a metal interact strongly with each other, but the Russian physicist Landau was able to introduce ‘quasi particles’ which interact more weakly. In some sense, we were still dealing with gases – or more technically, working in a ‘perturbative’ regime. Wilson’s PhD mentor, Murray Gell-Man, and Francis Low, with whom he interacted in his postdoctoral period, had already glimpsed the road beyond perturbation theory in the 1950s, and even coined the term ‘renormalization group’ which Wilson borrowed for his more general programme.

Theoretically inclined physicists of my generation saw both the ‘before’ and ‘after’ phases of this revolution. I was personally fortunate to interact with the lively group working on the physics of critical point at the Indian Institute of Science, and to witness both the early bewilderment and the later enlightenment produced by the new ideas. Of course, the later generation is fortunate to think from the outset in the Wilsonian way. One of them describes this synthesis for you in this issue.

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Resonance wishes its readers, authors, referees and editors a very happy 2017!