On Källén’s Scientific Work

Preface

This Part deals primarily with Källén’s view on his own work. He registers as a graduate student in Lund in 1948, at the age of 22. In the following year he is sent to Zürich to attend Pauli’s lectures April–July. Upon returning home, he proudly sends his first paper to Pauli. This remarkable paper is followed by several other astonishing pieces of work. Non-perturbative approach to quantum electrodynamics becomes his passion. He is writing “poetry” in field theory. Schwinger places him in his “Hall of Fame of Quantum Electrodynamics”.

Elucidating the non-perturbative features of quantum electrodynamics with rigor is too difficult, even for him. He turns to the much simpler Lee Model, hoping for guidance, but finds none. He writes a paper together with Wolfgang Pauli, announcing the existence of ghosts in the Model. He is disappointed.

He turns to the study of some general properties of the building blocks of scalar field theories (the n-point functions), hoping to learn about the structure of quantum electrodynamics. This new field of research is “close to his heart” and he has wonderful collaborators. He enjoys himself in the wonderland of functions of several complex variables. He claims being against too much emphasize on mathematics but loves the subject. He even writes a paper, “for physicists and not for publication”, on an alternative derivation of the Bergman-Weil integral. It gives him plenty of joy and he has found wonderful mathematical results. Again, he is disappointed by not having made progress in physics.

He chooses a new field of research: particle physics phenomenology. He has learned the subject quickly by writing a unique textbook about it. He spends a great deal of effort on doing radiative corrections to beta decay of the neutron. But he is a latecomer in the fast moving field of particle physics. At the very end, he becomes interested in current algebra but then death strikes.
The following chapters follow him, on his scientific path in the landscape of theoretical physics, primarily through his correspondence concerning his publications.