Dear colleagues, dear members of the family of Rudolf Haag,

as the chair of Hamburg's Center for Mathematical Physics and as the spokesperson of the research training group, the Graduiertenkolleg „Mathematics inspired by string theory and quantum field theory", I would like to welcome you to this colloquium „Local quantum physics and beyond" which is dedicated to the memory of Rudolf Haag.

Rudolf Haag died on January 5, this year, at the age of 93. Mathematical quantum field theory looses yet another founding father, which adds to the recent losses of Daniel Kastler, John Roberts, Robert Schrader, Raymond Stora, and, last weekend, of Wolfhart Zimmermann.

Rudolf Haag has been a professor at Hamburg University since 1967, until his retirement in 1987. We can be proud that, together with Harry Lehmann and Kurt Symanzik, he was one of modern founding fathers of mathematical physics in Hamburg. Up to this day, mathematical physics is an important and active branch of research in the mathematics department, the physics department and the theory group of DESY.

Many people in the audience have shared important moments with Rudolf Haag. They are in a much better position than I am to remember Rudolf Haag, the scientist and the person.

Rudolf Haag was the founding editor in chief of Communications in Mathematical Physics, a journal that is now 50 years old. In these 50 years, CMP has continuously contributed to shaping mathematical physics: the way in which it is done and how it is perceived, in mathematics and in physics.

It seems therefore appropriate to present some more general thoughts about mathematical physics.

Mathematical physics definitely does not exist as a subfield of mathematics, in the sense algebra, number theory, differential geometry or algebraic topology are subfields of mathematics. These subfields are clearly defined by the mathematical notions and techniques they use. Mathematical physics cannot be defined this way. Indeed, for each subfield of mathematics I just mentioned, each of you can definitely name more than one mathematical physicist who is fully accepted as a mathematical expert.

Mathematical physics does not exist as a subfield of physics either, in the sense solid state physics, high energy physics or cosmology exist as subfields of physics. These subfields are defined by some aspects of observable reality they describe. Mathematical physics again cannot be defined this way. Indeed, for each of these subfields of physics, each of you will be able to name more than one mathematical physicist who has substantially contributed to understanding phenomena in that subfield.

Also, it would be ridiculous to qualify mathematical physics as that part of physics that uses mathematics — or are we aware of any part of physics that does not use mathematics at all?

Obviously, all these points of view are inappropriate. In particular, they do not allow to really appreciate the work of Rudolf Haag.

Mathematical physics is, in my opinion, unified and characterized by two related efforts:

— the quest for conceptual clarity in the description of observable reality.
— the quest for concepts which open up ways to build bridges between physics and mathematics.

I do not have to explain to this audience Rudolf Haag's exceptional and impressive strive for conceptual clarity, which has been, for him, a lifelong central concern. And to mention just one example: everybody here is aware of the importance of the Haag-Kastler framework as a bridge between mathematics and physics. The Haag-Kastler framework alone is a gigantic and remaining contribution to the quest for conceptual clarity in the description of physical systems — the activity we commonly refer to as mathematical physics.

The talks and contributions during the next two days will show how much the ideas of Rudolf Haag are alive, and how much they prompt new research activities. There cannot be a more convincing appreciation of scientific work.

I would like to thank all of you for your contribution to this workshop, and I am looking forward to two very interesting days.