

- The major goal of the Session “**Computational Physics**” is to help **CMMSE-2005** in contributing to the celebration of a truly unique event of paramount importance “**World Year of Physics (WYP-2005)**” (<http://www.physics2005.org>). Let it be recalled that in October 2003, the General Conference of UNESCO (United Nations Educational, Scientific and Cultural Organization) made a resolution to endorse the decisions of EPS (European Physics Society) and IUPAP (International Union of Pure and Applied Physics) about choosing the current year as the “World Year of Physics 2005” or the “**International Year of Physics (IYP-2005)**” to mark one Century since Albert Einstein’s miraculous year 1905 when he published his theoretical ground-breaking papers on special relativity, photo-electric effect and Brownian motion. These publications paved the road to several fundamental branches of the 20th Century Physics, which revolutionized not only overall conceptual thinking in Physics *per se*, but also led naturally to flourishing of other basic and applied sciences as well as technologies. The main goal of WYP-2005 i.e. IYP-2005 is to use versatile media including international conferences to enhance the general public awareness of the importance and role of Physics and Physics related sciences for the modern civilization and its development.

- The two key bridges between Physics theories and practice are mathematical and computational methods, that constitute the very aims and scopes of CMMSE-2005. Similar bridges extend across other sciences and engineering all the way to technologies. This has previously been fully documented at **CMMSE-2002 (Alicante, Spain)** and **CMMSE-2004 (Uppsala, Sweden)** within the new and much needed movement across disciplines aimed at promoting “**Computational and Mathematical Methods in Sciences and Engineering (CMMSE)**”.

- In reference to his own celebrated lectures, Richard Feynman used to say that he learned most from his students. This exemplary attitude towards young minds in research has been vigorously implemented by CMMSE-2002 and CMMSE-2004, where a large number of young participants lectured in the freshest way to the delight and benefit of everyone involved including the most experienced, world-renowned colleagues.

- Some 60 years ago, Paul Dirac said: “The undergoing physical laws necessary for the mathematical theory of a large part of Physics and the whole of Chemistry are completely known, and the difficulty is only that the exact application of these laws leads to equations much more complicated to be soluble.” It is precisely in this direction that new mathematical and computational methods and algorithms are needed to implement first principles of Physics and the interdisciplinary conference series **CMMSE** is optimally suited for exchange of ideas and experience particularly via the Session “Computational Physics” and other Sessions related to Physics.

- The 20th Century Physics is the century of the atom whose stability can be explained only by quantum mechanics, which is thus far one of the deepest thoughts known to humankind. Erwin Schrödinger built the critical cornerstone of quantum mechanics through his famous “equation of evolution” for any physical system and beyond all the way to living species. In the same World Year of Physics 2005 or the International Year of Physics 2005, quantum physicists are proud to also celebrate ~ 60 years of the publication of Schrödinger’s visionary book “**What is Life? The Physical Aspect of the Living Cell**”.

- The modern renaissance in Medicine and Biology is deeply intertwined with Physics whose e.g. quantum aspects established themselves as pivotal to understanding vital issues of human health such as stability of the cell’s building block, the DNA. Here again, mathematical and computational methods are essential to further progress due to the enormous complexity of the studied interdisciplinary problems. **The most challenging problem of all is that of understanding living organisms and here major breakthroughs of Physics working together with Medicine, Biology and Chemistry are undoubtedly expected to rely heavily upon further advances in mathematical and computational methods.**

- One of the successes of CMMSE-2002 and CMMSE-2004 was in attracting participation of many researchers using mathematical and computational methods in Physics ranging widely from classical and traditional strategies all the way to quantum computing that are nearly all exportable to neighbouring sciences and engineering. With the goal of further pursuing this far-reaching prospect of cross-fertilization among different disciplines, alongside the previous pathways of CMMSE-2002 (Alicante) and CMMSE-2004 (Uppsala), the Chair of the Session “Computational Physics” is hereby cordially inviting both young and senior physicists and other scientists and engineers dealing with Physics to attend CMMSE-2005 and thus help this conference in becoming a noticeable contribution to celebrating the WYP-2005 i.e the IYP-2005.

The text written on March 22, 2005 by Dževad Belkić, the Chair of the Session “Computational Physics”
Professor of Mathematical Radiation Physics
Karolinska Institute, Stockholm, Sweden
<http://bookmarkphysics.iop.org>
<http://vector.iop.org/abstract/0750304960/>