TOPICS FOR THE SEMINAR

- **Zoo of topological solutions in classical gauge theories. (detailed derivation)**
- **Algebraic Quantum Field Theory.**
- **SU(5) Grand Unified Theory. (detailed derivation)**
- **Finite(Dirac)-mode regularization and chiral anomaly.**
- **The skyrmion.**
- **N=4 Super Yang-Mills.**
- **(Non-)Renormalization of the Supersymmetric QED (detailed derivation).**
- **Nambu-Jona-Lasinio model.**
- **Renormalization group flows. \phi^4 problem.**
- **Color-Flavor-Locked (CFL) phase in QCD.**
- **Superfluidity by Feynman (alternatively, by Landau).**
- **Gravitational waves around high energy particles.**
- **Shifman-Vainshtein-Zakharov sum rules.**
- **Quantum anomalies affecting classical motion.**
- **Supersymmetry in Quantum Mechanics.**
- **Instanton gas.**
- **Current algebra. Chiral Perturbation Theory.**
- **Particle creation in a background of a soliton.**
- **Multisoliton solutions via the Bäcklund transformation.**
- **Closed-loop gas as a field theory.**
- **Chaotic Field Theory.**
- **Type II superconductors. (detailed derivation)**
- **Beta-function of the Yang-Mills theory (detailed derivation).**