

Return by 12.00, Monday 21.10.2021,
(electronically to olli.a.koskivaara@student.jyu.fi or in paper to a box outside Fys.1.)

- 1.** Compute the QED pressure at finite temperature to order e^2 , assuming one species of massless fermions with a non-vanishing chemical potential. (This is the sunset diagram).
- 2.** Compute the photon mass in the QED at finite temperature and chemical potential. And then the QED pressure in finite density to order e^3 , assuming one species of massless fermions with a non-vanishing chemical potential.
- 3.** Go carefully through the derivation of the coefficients of zero-mode terms ϕ_0^4 and $\phi_0^2(\nabla\phi_0)^2$, and derive the dimensionally reduced coupling parameter in terms of a coupling constant λ_M , defined to be the 4-point function measured at $s = t = u = M^2$.