the pressure from the electrons. The constant B is so determined that the pressure vanishes at zero density and temperature. In addition to the Eqs. (3) and (4), the pressure must satisfy,

$$n_Q \equiv \frac{\partial p}{\partial \mu_Q} = 0, \tag{5}$$

$$n_3 \equiv \frac{\partial p}{\partial \mu_3} = 0, \tag{6}$$

$$n_8 \equiv \frac{\partial p}{\partial \mu_8} = 0, \tag{7}$$

so that local electric and colour charge neutrality conditions are met. Once, the pressure as a function of quark chemical potential is known, quark matter EOS can be easily computed.

The model parameters, the current quark masses $m_{u,d,s}$, quark-antiquark coupling G_S, the strength K of the six fermion or "t Hooft" interaction and the cutoff parameter Λ are taken to be [41],

$$m_u = m_d = 5.5 \text{ MeV}, \tag{8}$$

$$m_s = 140.7 \text{ MeV}, \tag{9}$$

$$G_S \Lambda^2 = 1.835, \tag{10}$$

$$K\Lambda^5 = 12.36, \tag{11}$$

$$\Lambda = 602.3 \text{ MeV}. \tag{12}$$

After fixing the masses of the up and down quarks, $m_u = m_d = 5.5$ MeV, the other four parameters are chosen to reproduce the following observables of vacuum QCD [41]: $m_\pi = 135.0$ MeV, $m_K = 497.7$ MeV, $m_{\eta'} = 957.8$ MeV, and $f_\pi = 92.4$ MeV. This parameter set gives $m_\eta = 514.8$ MeV. The value of B for this set of parameters is $(425.4\text{MeV})^4$. There are two more parameters, the diquark coupling strength G_D and the vector current coupling strength G_V, which are not known. One expects that the diquark coupling has a similar strength as the quark-antiquark coupling. We construct quark matter EOS for $G_D = 1.1 - 1.2G_S$ with $G_V = 0 - 0.2G_S$.

In the 2SC phase, pairing occurs only between the u and d quarks and the s quarks remain unpaired leading to $\Delta_1 = \Delta_2 = 0$ and $\Delta_3 \neq 0$. On the other hand, in the CFL phase, $\Delta_1 \neq 0$, $\Delta_2 \neq 0$ and $\Delta_3 \neq 0$. In the left panels of Figs. 2 and 3, we plot the pressure as a function of the quark chemical potential for the nuclear matter and for the quark matter in the 2SC and CFL phases. The phase realized at a given chemical potential is the one having largest pressure. Thus, it is evident from the $P - \mu$ curves that direct transition from nuclear matter to the CFL quark matter occurs