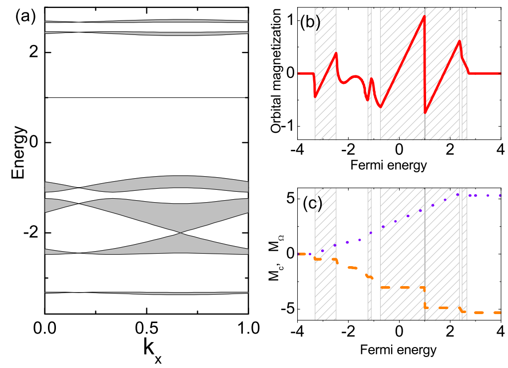

FIG. 4: (Color online). Energy spectrum and orbital magnetization for f=1/3.

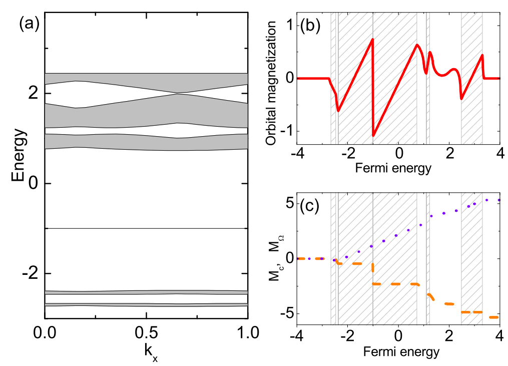

FIG. 5: (Color online). Energy spectrum and orbital magnetization for f=1/6.

behavior between insulating and metallic regions. In the insulating region, M_Ω linearly increases with μ_0, as is expected from Eq. (10). The slope of the Berry-phase correction term in insulating regions is proportional to the system's Hall conductance. In the metallic region, however, this term sensitively depends on the topological property of the band in which the chemical potential is located. On the whole the comparison between Fig. 3(b) and Fig. 3(c) shows that the metallic behavior of $\mathcal{M}$ is dominated by its conventional term M_c, while in the insulating regime M_Ω plays a main role in determining the behavior of $\mathcal{M}$.

Now let us consider more complex cases, for example, with a field f=1/3 and with a field f=1/6. In these two case, there are more energy bands and gaps appearing in the energy spectrum [see Figs. 4(a) and 5(a)]. Figures 4(b) and 4(c), and Figs. 5(b) and 5(c), for f=1/3 and f=1/6, respectively, plot the magnetization $\mathcal{M}$ and its two components as functions of μ_0. Clearly from these figures, one can observe a similar variation of the magnetization by changing the electron's fillings (the Fermi energy μ_0). Comparing the case of f=1/3 [Fig.