On the spectrum of an 'even' periodic Schrödinger operator with a rational flux of the magnetic field

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In $L_2(\mathbb{R}^3)$ we consider a self-adjoint Schrödinger operator

$$H = (-i\nabla + A(x))^2 + V(x)$$

with magnetic potential $A(x)$ and electric potential $V(x)$. In 1998 A. Sobolev showed that the spectrum of H is absolutely continuous if the coefficients A and V are periodic in $\mathbb{R}^3$. It is more natural to suggest that the magnetic field $B = \operatorname{rot} A$ is periodic rather than A itself. If B is periodic then the potential A can be represented as a sum of periodic function and a linear function. Linear term is defined by the flux Φ of the magnetic field through the cell of periodicity, $\Phi = \int_\Omega B(x)dx$.

We assume that the operator H satisfies two extra conditions:

- the flux Φ is integer;
- the operator H is invariant under reflection of one of coordinate axes.

We prove that under these assumptions the spectrum of H is absolutely continuous.