Skovoroda notes that stellarator and mirror physics contain concepts which are largely unfamiliar to the tokamak physicist. Most of them refer to qualities of the magnetic field, e.g.,

- omnigenous: the radial guiding-centre drift vanishes on an orbit average for all particles,
- quasi-isodynamic: omnigenous and poloidal precession of trapped particles,
- quasi-symmetric: $|B|$ is independent of a linear combination of the toroidal and poloidal Boozer angles.

These terms appear in Section 2 of our paper as an introduction to the main kinetic calculation in the following section. Skovoroda criticises us for not mentioning two further classes of fields:

- pseudo-symmetric: all level contours of $|B|$ are poloidally, helically or toroidally closed,
- isometric: $B$ depends on the arc length $l$ along the field in the same way for all field lines on each flux surface $\psi$, i.e., $|B| = f(\psi, l)$. This implies that the distance along $B$ between different contours of $|B|$ is independent of the field line.

However, these concepts do not play any independent role in our calculation. Pseudosymmetry is a necessary, but not sufficient, condition for omnigeneity [1], which, contrary to the assertion of Skovoroda, does not imply isometry [2]. The results in our paper about the neoclassical properties of quasi-isodynamic fields do not in general

\[\text{1 Cary and Shasharina [3] appear to use the word “isometry” differently, meaning that the distance between points with the same } |B| \text{ on either side of a minimum should be independent of the field line. Omnigeneity then does imply isometry.}\]
hold for pseudo-symmetric ones. In the following list, each class of magnetic fields is a subset of the following one:

quasi-symmetric \subset isometric^2 \subset quasi-isodynamic \subset omnigenous \subset pseudo-symmetric.

In practice, what one wants to achieve is good confinement (omnigenity or quasi-isodynamicity) and perhaps undamped rotation (=quasi-symmetry [6]), but not isometry or pseudo-symmetry *per se*.

**References**


\[^2\] As Skovoroda has shown himself, however, in stellarators the distinction between isometry and quasi-symmetry is academic, since they coincide whenever the rotational transform is irrational [4, 5]