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I will talk about a method for deciding when a regular abelian cover of a finite CW-complex has finite Betti numbers. To start with, I will describe a natural parameter space for all regular covers of a finite CW-complex X , with group of deck transformations a fixed abelian group A , which in the case of free abelian covers of rank r coincides with the Grassmanian of r -planes in $H^1(X, \mathbb{Q})$. Inside this parameter space, there is a subset $\Omega_A^i(X)$ consisting of all the covers with finite Betti numbers up to degree i .

We present here a method, which generalizes a theorem due to Dwyer and Fried, for computing these sets in terms of the jump loci for homology with coefficients in rank 1 local systems on X . For some nice spaces, e.g., quasi-Kähler manifolds, the generalized Dwyer-Fried invariants can be computed in terms of intersections of algebraic subtori in the character group. For many spaces of interest, the homological finiteness of abelian covers can be tested through the corresponding free abelian covers. Yet in general, abelian covers exhibit different homological finiteness properties than their free abelian counterparts. (Received February 13, 2011)