Mathematical Basis of Bohr−Sommerfeld

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- *From*: Squark <top.squark@xxxxxxxxx>
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Hello everyone!

The Bohr−Sommerfeld rule allows approximating the spectra of integrable
systems in a quite accurate way, at least for high quantum numbers.
The most general formulation of the rule is as follows (I converted a
less
high−brow formulation into this form, I hope I got it right):

We know the phase−space (X, omega) of an integrable system is foliated
by invariant Lagrangian tori (btw, does it mean the phase−space is a
locally trivial fibration with toric fiber? Or are there exceptional
fibers?)
Lets choose a U(1) bundle L and connection A over the phase space,
such that omega is the curvature of A (together with the Lagrangian
foliation we have for free, these comprise precisely the data for
geometric quantization!) Then, the restriction of A on any of the the
tori
is flat (since the tori are Lagrangian). However, some tori are
special:
the restriction on them is not only flat but trivial (all of the
monodromies
are trivial). These are the tori "selected" by the Bohr−Sommerfeld
rule,
and the values of the Hamiltonian (and the other integrals of motion)
on
them form the predicted quantum spectrum.

The question is, has anyone shown the approximation to be "good", in
some sense, in a mathematically rigorous way? At least for the high
quantum number asymptotics?

Best regards,
Squark

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