Re: Parallel Transport Of A Vector Around a Closed Curve in Schwarschild Metric

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From: Neil (*neil_delver_at_yawwho.com*)
Date: 02/18/05

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"David Park" <djmp@earthlink.net> wrote in message
news:95vQd.1740$9J5.1735@newsread2.news.atl.earthlink.net...
> *<lost.and.lonely.physicist@gmail.com> wrote in message*
> *news:1108430326.236765.302190@c13g2000cwb.googlegroups.com...*
> > *I understand there is an experiment floating in space right now testing*
> > *the Lens−Thirring effect (Gravity B probe).*
> >
> > *Am I correct, however, that even if the Earth is not rotating a vector*
> > *parallel−transported around a closed curve around the Earth would not*
> > *necessarily be returned to the same vector?*
<<snip>>
> > *Is this a sensible result? I had earlier thought that vectors do not*
> > *return to their original condition only for a spining Earth, hence the*
> > *term "frame dragging".*
> >
>
> *Yes, there is an effect called the 'geodetic precession' that is unrelated*
> *to, and much greater than, the frame dragging effect. It's about 6.61 arc*
> *seconds per year for Gravity Probe B.*
>
> *This is discussed in the Hartle Gravitation text in Chapter 14. However the*
> *result is a little different than what you give.*
>
> *dphi(geodetic) = 2 Pi [1 − Sqrt(1− 3M/R)] per orbit where geometric units*
> *are used.*
>
> *There is also an analysis in the Foster & Nightingale text: A Short Course*
> *in General Relativity in Section 4.7, where they call it the 'geodesic*
> *effect'.*
>
> *I think the effect is principally caused because the satellite makes one*
> *orbit in coordinate time t, but the tracking of the gyroscopes is in proper*
> *time tau.*
>
...

How is angular momentum conserved?