A.D. KRISCH: Papers, Future Run & PAC
1. He said that page 19 of the IKP 2008 Annual Report Highlights has an article about the test of Kondratenko Crossing (KC) by SPIN@COSY; he thanked Lehrach and Lorentz for doing a good job in preparing the article.
2. He said that the submitted KC test PRL is still with the second referee who earlier said that the paper should be published if his/her comments are addressed; PRL recently requested the referee to respond more promptly.
3. For the new Narrow Resonance Paper, we mostly focused on trying to understand the deuteron and proton data.
4. There has been much discussion of the ArXiv paper. Recently, Maier e-mailed Krisch saying “I will never continue to insist on keeping any self-destructive matter alive!”. Krisch asked if that meant that we could now forget the ArXiv paper issue and focus on the future; Maier responded: No, Dieter should now discuss the ArXiv papers.

D. PRASUHN: ArXiv Paper & COSY Schedule
1. He said that he had e-mailed a revised version of the ArXiv paper, which everyone could read and comment on; he did not receive any objections so far. He suggested 3 options: withdraw the posted paper, replace it with a revised version, or remove the COSY authors from it. He said the collaboration needs to decide how to proceed.
2. Krisch stated some objections to the revised paper: *It removed many important sentences and paragraphs from the abstract, introduction, conclusions, summary and references, replacing them with nothing or almost nothing. *Its 2-sentence abstract never mentioned resonance strength. Thus, it is not acceptable. He said Leonova made files of the posted and revised papers with all changes highlighted; he offered to e-mail them to anyone who asked.
3. Krisch then said that the above problems are not relevant since posting any revised paper would be self-destructive: Any revised paper with no COSY authors would cause many people to ask why the COSY authors now decided to withdraw their names from a paper, which was earlier submitted 3 times to PRL and once to PRST-AB with their permission to include their names. Thus, it was decided that the SPIN@COSY collaboration would not submit any revisions to the posted ArXiv paper. Any individual authors can submit any paper anywhere they wish.
4. Maier and Prasuhn were very unhappy with this decision. Prasuhn said he was leaving the Collaboration.
5. Prasuhn then again suggested replacing the posted ArXiv paper with the revised paper; he added that no one objected to the revised paper prior to today’s Teleconference. Krisch replied that many authors outside COSY are against posting any revision; thus, it was decided to not post any revision.
6. Prasuhn said they may post a new version with the explanation why they are posting another paper.
7. Prasuhn asked why the paper was posted even though he transmitted the COSY authors’ objection a few hours prior to online submission. Krisch responded that, despite his 11jan09 e-mail request, with 2 options, no one, including the 3 COSY Teleconference participants, objected to posting the paper on ArXiv before or at the 15feb09 Teleconference, which was the stated deadline. Thus, it was decided at the Teleconference to post it on ArXiv.
8. Maier then asked if the collaboration was over. Krisch said that the SPIN@COSY Collaboration will continue because there was still much high quality data to be analyzed and published, even if there is no more beam-time.

E.J. STEPHENSON: EDM Status
1. Krisch asked if it would be useful for Leonova to join the June 09 dEDM run as Maier had suggested at the Feb09 Teleconference. Stephenson said he would discuss it with his colleagues and then contact Leonova.
2. Stephenson said they had a discussion with the COSY staff concerning automation of the operational procedures. They were pleased with COSY’s response because almost everything that was needed, such as the supercycle, was already in place. They also discussed with Gebel how to acquire more data with the LEP.

V.S. MOROZOV / A.M. KONDRATENKO: New KC Shape
1. Pages 2–16 of his e-mailed 16-page file were Kondratenko’s talk at SPIN 08. The crossing shape shown on page 1 is based on this talk. It defines a simple and symmetric shape and defines all parameters in experimental language.
2. This new 3-crossing KC pattern should be easier to implement because: it is less complicated; all ramps are slower; and there are no sharp corners. The new pattern consists of three linear resonance crossings connected by rotated parabolas; it is symmetric, which reduces the number of parameters that need to be optimized. The figure shows the parameters that define the pattern: $\Delta f_a = \Delta f_c$, $\Delta f_b$, $\Delta t_a = \Delta t_c$, and $\Delta t_b = \Delta t_c$. The crossing pattern should satisfy 3 simple conditions 1) all 3 crossings should be fast; 2) the crossing rates must satisfy: $\Delta f_a/\Delta t_a = 4 \Delta f_b/\Delta t_b = \Delta f_c/\Delta t_c$; 3) the spin rotation angles around the vertical axis between crossings must satisfy: $\Psi_{ab} = \Psi_{bc} = \pi m$, where m is an integer. There are also conditions on $\delta_a$, $\delta_b$ and $\delta_c$, the spin rotation angles around a horizontal axis during the a, b, and c crossings.
4. We tried to satisfy these conditions for the pattern on page 1; it has: $\Psi_{ab}(\pi/2) = \Psi_{bc}(\pi/2) = 0.65$; $\Psi_{ab}(\pi/2) = 0.35$, and $\Psi_{ab}(4\pi) = \Psi_{bc}(4\pi) = 1.02$. It should work for resonances with strength $E < 10^{-5}$.
5. Krisch thanked Prasuhn for pointing out in nov08 that the 1-crossing pattern used with the rf-solenoid was not practical for COSY’s rf-cavity, because its changes were too sharp. He added that the 3-crossing pattern looks very promising. Prasuhn asked if this pattern was intended for flat top or for acceleration; Morozov replied that it could be used for either, but for acceleration it would be superimposed on top of the normal acceleration ramp.
6. Prasuhn asked if the links between the linear crossings had to be parabolas, or could be linear horizontal segments; Morozov said that they did not have to be parabolas from theoretical point of view; Kondratenko agreed they could be linear segments, Krisch said we chose a smooth curve, because hardware had trouble with very sharp corners, and to ensure that the beam would follow the cavity’s rf. Prasuhn said one can produce sharp corners for frequency
changes, but the beam’s ability to follow depends on the frequency change rate. Krisch then agreed that using a
calculated parameters for use during acceleration, but the new ramp times are now tens of milli-seconds, not sub-
milliseconds.
8. Since an even number of Siberian Snakes work better, Krisch asked if the 3-crossing pattern might work better if m
were odd or even in the condition $\Psi_{ab} = \Psi_{bc} = \pi m$. Kondratenko said that an even m should work better when the
resonance strength $E$ has a spread (e.g. intrinsic resonances).

M.A. LEONOVA: Possible Run Plan
1. She said that the e-mailed draft Run Plan did not yet include any details of the proposed KC studies. She said we
plan to use the dEDM’s “tube” target and asked if COSY could set up for running with it at 1850 MeV/c during the
dEDM setup and then archive the ring’s setting for any future run. Prasuhn said that, unless SPIN@COSY runs
immediately after dEDM, the target must be re-installed in the ring and set up for running immediately before any
run; Leonova agreed to modify the Run Plan accordingly.
2. She first discussed: the beam set-up with different bunching and cooling; and then the rf-solenoid and EDDA tests.
3. She next discussed the Run Plan’s Part 1: the spin resonance search and the resonance strength calibration.
4. Part 2 is mapping the resonance with bunched beam and varying the rf-solenoid on-time; she showed predictions
for these studies. Part 3 is a repeat of Part 2 with unbunched beam; there are no predictions for these studies yet.
5. Part 4 involves resonance maps with different rf-solenoid on-times. Part 5 is varying the synchrotron frequency.
6. Part 6 is a test of the new 3-crossing KC pattern discussed above; Part 6 details still need work.
7. Parts 7 and 8 are resonance maps with uncooled bunched and unbunched beams, respectively.
8. The total time for the planned studies is 21.5 shifts. Maier and Prasuhn said several times that the proposed studies
disagree with the PAC’s recommendation that SPIN@COSY should work on improving EDDA’s deuteron tensor
polarization measurements. Krisch replied that some of the PAC’s many comments seemed self-contradictory.
9. Maier said that SPIN@COSY will not run in November 09. Krisch responded that SPIN@COSY plans to follow
the advice in Prof. Strocher’s 16mar09 and 18mar09 e-mails and submit to him a 5-day Run Plan for week 47 and a
Proposal for the 7-8sep09 PAC.

V.S. MOROZOV: Narrow Deuteron Resonance Paper
1. He said that we mostly worked on analysis for deuteron resonance maps. Page 1 shows both our data and his
numerical calculations for solving spinor equations for the parameters listed above the figure. Lehrach asked what
was used for the calculation; Morozov said that he followed Chao’s note, which was re-distributed before the feb09
Teleconference. He solved numerically a system of differential equations for the two spinor components.
2. Morozov then tested the sensitivity of the calculations’ results to various parameters. Page 2 plots the polarization
at the resonance center vs. the synchrotron frequency $f_r$; it shows a dependence on the initial synchrotron phase for
small $f_r$ values. Page 3 is a blow-up of the region where there was phase-dependence. The pp. 2-3 calculations were
for a spin resonance frequency spread of $\delta f = 10.4 \text{ Hz}$
3. He repeated these calculations on pp. 4-5 for $\delta f = 20.7 \text{ Hz}$, and on pp. 6-7 for $\delta f = 41.4 \text{ Hz}$.
4. Page 8 showed, for all three $\delta f$ values, the polarization at the resonance center averaged over all initial synchrotron
phases plotted vs. the synchrotron frequency. Note that the average polarization oscillates around zero.
5. Page 9 illustrated some observations based on pp. 2-8 by plotting 3 different parameters vs. $\delta f$:
   - The $f_r$ region, where the polarization oscillates, increases with $\delta f$;
   - The $f_r$ region, where there is phase dependence, does not depend upon or decreases with $\delta f$;
   - The polarization oscillations’ wavelength increases with $f_r$ and seem to exhibit a beating pattern.
Krisch noted these are calculations, not data.
6. Page 10 plotted polarization vs. synchrotron frequency from single-particle calculations for on-momentum and
some off-momentum particles; it showed that for large $f_r$ values, all particles behave like an on-momentum particle.
7. Page 11 plotted the polarization at the resonance center vs. an rf solenoid’s on-time; it compares the calculation
with a cos wave, showing that the polarization oscillates with a frequency $2\pi E f_r$.
8. Page 12 plotted the center’s polarization vs. an rf solenoid’s turn-on/turn-off time; it also showed oscillatory
behavior. Krisch said that they observed a similar effect at IUCF, but never published it in a journal; it was in
IUCF’s 1991-92 Annual Report (pp 110-115) and in S.Y. Lee’s book. It was called “free spin precessions” and it
indicates that one must be very careful about how quickly one turns on and off or keeps on such an rf device.
9. Page 13 showed our deuteron map data with calculations for different solenoid on-times; note that if the solenoid’s
total on-time rotates the polarization by $2\pi m$, then the center of the resonance has the initial polarization.
10. Page 15 showed data and calculations for different spin frequency spreads $\delta f$; the curve’s FWHM is almost
independent of $\delta f$, but the polarization value of at the center should depend on $\delta f$, as shown on page 14.
11. Page 16 plots the $\chi^2$ for our data vs. $\delta f$; it suggests that the $\delta f$ spread with bunched beam was larger than that
measured with unbunched beam.
12. Pages 17 and 18 showed both fixed-frequency maps and frequency-sweep maps from the November 08 proton run.
We tried making calculations for protons similar to those for deuterons, but it seems that some proton parameters
cause difficulties for these calculations; we plan to consult with Chao on this. Thus, for now, we fit the proton data
to higher-order Lorentzians, as shown.

ROUNDTABLE:
1. The next SPIN@COSY Teleconference was tentatively scheduled for Thursday, 23 April 2009 at 16:30 German
time or 10:30 Michigan time.