



Dietrich Müller – the Artful Dodger of Physics
After dinner remarks by S. Coutu
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Warning! The following after dinner remarks were meant to be heard only after suitably copious amounts of wine had been consumed. Read this in a sober state at your own risk!

Simon, I was under the impression that we were supposed to roast Dietrich this evening, not just toast him... Did I miss a memo? At any rate, Dietrich has a pretty thick hide, and besides he will have the opportunity to respond in a few minutes, so here goes...

We just heard from several speakers singing Dietrich's praises... One wonders how well they know him. Perhaps it takes repeated balloon campaigns for extended periods of time in isolated parts of the world to gain the true measure of a man. Having done this with Dietrich, I feel uniquely placed to lay the claim that Dietrich is the "Artful Dodger of Physics." Now, by this I don't mean that one has to watch one's wallet around him; he's more likely to pick your brains than your pocket... Although, come to think of it, speaking of pockets and respect for others' property, Dietrich, were you ever planning to return to me my Pocket Multi-Channel Analyzer that you borrowed, what, two years ago now?... At any rate, by "Artful Dodger of Physics" I mean that Dietrich's personal and professional life reads like a distinguished chronology of narrowly averted disasters. In effect, Dietrich has been artfully dodging one bullet after another all his life.

Case in point: I first began collaborating with Dietrich in 1993, as a new post-doctoral fellow at the University of Michigan, on the HEAT balloon experiment. This was an experiment aiming to study high-energy antimatter particles in the cosmic-ray flux, and it had at its core a superconducting magnet. Within two weeks of first meeting Dietrich, we were doing final tests on the newly constructed HEAT instrument prior to leaving on a balloon campaign to Canada. We were trying to turn on the magnet for the first time to full field, with all the delicate particle detectors assembled around it. At one point a loud

venting noise occurred as the magnet was nearing full field, indicative of a quench when the magnet lost its superconductivity. Not knowing what was happening and being of a cowardly nature, I bolted for the door, only to hear a loud explosion when the pressure build-up from the liquid helium rapidly vaporizing inside caused the cryostat to rupture. Dietrich was standing right in front of the magnet, just where the whole end-cap plate came off. He was only saved from being embedded in the wall behind him by a large structural beam that had just been installed that morning, absorbed the shock of the explosion, and prevented the end cap from flying off! Dodging bullets indeed!

As a result of this explosion, many of the delicate detector components were damaged, in particular all the wires in Dietrich's transition radiation detector snapped. We spent a year repairing the damage, and having a new magnet made. I had the opportunity to come to Chicago and spend some time helping with the restringing of the TRD, and came to admire the beauty of Dietrich's chamber design. However, Dietrich, for future reference, next time it might be better to use thicker wire that one can actually see. I felt like the tailor in the Emperor's New Clothes trying to weave invisible thread on the TRD frame! We finally went to the field with the HEAT instrument and successfully flew it in New Mexico and Northern Manitoba, Canada, accumulating the world's best positron data. This did not come without its price in dodged bullets, however. In 1994 at the end of the flight from Ft Sumner a termination command was issued, whereupon the payload obstinately refused to come down as the balloon failed to detach from the parachute. Since the balloon was in an unknown state, NSBF decided that no risk could be taken to fly over any populated area, in case the instrument should come loose without warning. We spent a long sleepless night watching in horror as the payload kept inching closer to Amarillo Texas, at a high risk of getting cut down from the parachute and be allowed to free-fall into the desert rather than risking a flight over the city. It took all of Dietrich's diplomatic skills and luck, not to mention liberal applications of Bombay Sapphire with the NSBF crew, to have the payload slowly skirt around the edges of the city, and ultimately land safely. Another bullet dodged!

The following year we went to Canada with the HEAT payload. Dietrich wasn't with us for that campaign, but near disaster seemed to follow by proxy. For one thing we might have taken a clue from the fact that all of Northern Canada was on fire that summer, a bad sign. We spent a month in Lynn Lake, Manitoba, waiting for decent launch conditions, and very nearly missed the launch window for turnaround conditions, but ultimately did manage to get the payload off the ground. Unfortunately overnight the weather deteriorated and the following day the instrument seemed headed straight towards Hudson Bay, where it would have been lost. A decision was made to terminate the flight despite the bad weather conditions. The instrument landed in a large lake, but the parachute failed to detach properly, so that the HEAT payload was dragged, parasailing across the lake in 40 knot winds! Eventually the instrument reached shore and was dragged for several hundred feet until the parachute shredded and left the instrument on its side. All kinds of external attachments were ripped out and destroyed, and our stuffed mascot Bill The Cat who had flown attached to the outside of the payload was also a casualty and was left at the bottom of Tadoule Lake. The pressure vessel was dented and punctured beyond repair, which was sad as the shells had been designed and

built for Luis Alvarez's group at Berkeley in the late 60's, and had had a long and glorious history. The instrument inside the shell however suffered fairly little damage, and another bullet was dodged! Sadly however all of Dietrich's invisible TRD wires popped again...

Ultimately we were able to refurbish much of the instrument into a different configuration to study antiprotons. Over the years we went on a number of balloon campaigns with the HEAT-pbar instrument only to face a variety of near disasters. In one case the instrument was headed straight for the Grand Canyon. We had one instance of a balloon failing near the end of ascent, but ultimately we were able to retrieve the payload, refurbish it in the field and relaunch it within the same campaign. In another instance we missed a launch opportunity when we were in Ft Sumner in September 2001; after general aviation was grounded following 9/11, including balloons, the turnaround window came and went. To be fair, I am not blaming the 9/11 events on Dietrich's disaster proneness! We did end up with one good flight and the world's best high-energy antiproton measurements. Again Dietrich came out smelling like roses, narrowly evading the most dire outcomes.

There are plentiful other examples one can draw upon. Dietrich built a beautiful experiment called CRN, to measure cosmic-ray elements, which flew on the Space Shuttle Challenger in 1985, the very last successful flight of this Shuttle, one flight away from total disaster! Dietrich designed and built an enormous instrument called TRACER to measure the elemental composition and spectra of the high-energy cosmic-ray flux. A couple of years ago this payload was flown in Antarctica, performing excellently and collecting beautiful data. Part-way through the flight a battery exploded, damaging the instrument and covering much of it in nasty black soot. And yet, somehow the instrument managed to land within relatively easily recoverable distance of McMurdo station, so that it didn't have to be taken apart using a Sawzall, NSBF's preferred recovery technique... It was brought back whole, repaired, and flown again successfully recently from Sweden. Bullets dodged left and right!

Now, those of us working closely with Dietrich tried to counter as best we could the disastrous aura surrounding him by adopting practices of "safe science". For instance, on the HEAT instrument we had some temperature sensors mounted throughout the instrument to monitor the health of the payload. In particular, one sensor mounted near the neck of the magnet was at risk of shorting out when the neck frosted over whenever we transferred cryogenic liquids into the magnet. Since this looks to be a largely NC-17 audience, perhaps it's safe to relate that I came up with the idea of wrapping the temperature sensor in a condom. If you think about it, this should afford maximum sensitivity to temperature and be waterproof at the same time (one hopes)! In Ann Arbor there used to be a store named "Condom 101" that sold nothing but prophylactics. I went there but was completely dumbfounded by the array of condom choices of various colors, textures, tastes, lubrications, etc... In desperation I walked up to the pretty young lady staffing the store at the checkout counter, and asked her which were the smallest condoms they had for sale... To her credit, she didn't even bat an eye and answered they were all pretty much the same size... It was never clear to me whether Dietrich approved

of such shenanigans, but I guess the proof was in the pudding and the trick worked, so it was acceptable...

In December 2001, Dietrich's circulatory system tried to kill him. Now, if what happened to him happened to you or me, we'd be alone raking the leaves in our backyard at dusk with no one else around, and it'd be curtains for us. Not so for Dietrich! This happens to him at a University conference right in front of a crack cardiac and thoracic surgical team, who proceed to save his life and operate on him within a couple of hours. Amazing! How does he do these things???

We are now collaborating with Dietrich on a new project, the CREST experiment, which is scheduled to fly in Antarctica in a couple of years. Given his track record, I shudder to think of what lies in store for us, but with his luck and artfulness, I, for one, will gladly follow him to the ends of the Earth.

As much as some of us his close colleagues and collaborators might hate to admit it in front of him, we are all better scientists for having worked with and learned from him. He has kept us honest and always made sure we couldn't get away with being sloppy. Dietrich, now that you are emeritus, may you have fewer bullets to dodge, and may we continue to all benefit from your scientific artfulness. Thanks for everything and all the very best!