Table 3: Ordered moments from refining the low-temperature data from D10 and D23 using Irep(4). Two refinements were performed: one constraining the moments to lie only along **a**; and a second with the moments free in the (a, c) plane. The residuals for each refinement are also shown. All moment values are given in μ_B. Note that both nuclear and magnetic Bragg peaks were measured and that the refinements included both nuclear and magnetic structures.

	D10		D23	
Scanned reflections:	421		269	
Independent reflections:	417		121	
Irep(4)	$(M_x, 0, M_z)$	$(M_x, 0, 0)$	$(M_x, 0, M_z)$	$(M_x, 0, 0)$
Moment along a	3.13 (8)	3.33 (7)	3.3 (1)	3.62 (6)
Moment along c	−0.6 (1)	–	−0.6 (1)	–
Total moment	3.36 (9)	3.33 (7)	3.5 (1)	3.62 (6)
R_{F^2}	8.759	9.14	10.50	11.51
R_{wF^2}	46.47	47.30	22.77	25.06
R_F	11.32	11.71	9.714	10.56
χ^2	4.198	4.359	0.8128	0.9853

most likely present.

A schematic of the magnetic structure for $CoPS_3$ is shown in figure 7. The originally published structure is shown in figure 7(b), while the results for the current refinement are shown in figure 7(c). The current refinement results in a structure that is qualitatively identical to that for $NiPS_3$ [8].

The temperature dependence of the (010) Bragg peak was followed as a function of temperature to quantify the critical behaviour of the sublattice magnetization in $CoPS_3$. The results are shown in figure 8. The Bragg peak intensity decreases as a power law with an exponent of $2\beta = 0.60 \pm 0.01$ close to T_N, which was established to be 119.1 ± 0.1 K in the analysis. The exponent was determined from fitting data in the temperature range $109 \leq T < T_N$, or from a reduced temperature $(1 - T/T_N) \leq 0.085$. The exponent is roughly similar to that expected for a phase transitions in a three-dimensional material, suggesting that $CoPS_3$ may be less two-dimensional than some of the other members of the MPS_3 family. The temperature dependence is remarkably similar to that observed for $NiPS_3$, with the same exponent within approximately the same reduced temperature range.