

2016A 期 採択長期利用課題の事後評価について - 1 -

公益財団法人高輝度光科学研究センター  
利用推進部

2016A 期に採択された長期利用課題について、2017B 期に 2 年間の実施期間が終了したことを受け、SPring-8 利用研究課題審査委員会長期利用分科会による事後評価が行われました。

事後評価は、長期利用分科会が実験責任者に対しヒアリングを行った後、評価を行うという形式で実施し、SPring-8 利用研究課題審査委員会で評価結果を取りまとめますが、同一研究テーマの課題が 2018A 期からの長期利用課題として新たに申請されたため、その面接審査と同時に最終期 (2017B 期) 終了前に当該課題のヒアリングを第 62 回長期利用分科会 (2017 年 12 月 12 日および 15 日開催) において行いました。その後、当該課題の最終期 (2017B 期) が終了し、実験責任者より改めて提出された、全期間の研究結果をまとめた最終版の「長期利用課題終了報告書」およびヒアリングの結果を踏まえ、長期利用分科会による最終的な評価結果がとりまとめられました。

以下に評価を受けた課題の評価結果を示します。研究内容については本誌の「最近の研究から」に実験責任者による紹介記事を掲載しています。

なお、2016A 期に採択された長期利用課題 4 課題のうち残り 2 課題の評価結果は次号以降に掲載する予定です。

－ 課題 1 －

課題名	Magnetic Compton scattering and Fermiology studies in high magnetic fields
実験責任者(所属)	Duffy Jonathan (University of Warwick)
採択時課題番号	2016A0131
ビームライン	BL08W
利用期間/配分総シフト	2016A～2017B/96 シフト

[評価結果]

The project leader established the system of a magnetic Compton scattering with high magnetic field at 1.5 K. Since

this is one of the purposes of the present Long-Term Proposal, the committee appreciates this point. Also, the committee appreciates that the project leader allowed to use the high field magnet, which was developed by the leader, for a common-use (a general-use).

Regarding the experimental results, some of the data on the proposed samples were taken as scheduled, but some of them were not scheduled in the proposed plan. It is a little bit disappointing that the data quality has not been improved significantly in comparison with conventional data.

Although the Long-Term Proposal proposed by the present leader was adopted in 2012, no original papers have been published up to now. The committee strongly suggests that the project leader should publish exciting original papers based on the results taken in not only the previous, but also the present Long-Term Proposal as soon as possible.

[成果リスト]

登録なし

－ 課題 2 －

課題名	Examination of glottis function at birth with multi-view phase-contrast imaging
実験責任者(所属)	Hooper Stuart (Monash University)
採択時課題番号	2016A0132
ビームライン	BL20B2
利用期間/配分総シフト	2016A～2017B/72 シフト

[評価結果]

The group led by Prof. Hooper has conducted investigations on the relationships among glottis function, spontaneous breathing, and lung aeration, during the past and this Long-Term Proposal by fully utilizing the phase-contrast imaging technique. The research is quite unique not only as an application of synchrotron radiation but also as a pre-

clinical research. The project group has offered many valuable information for improving resuscitation of neonates based on the results of the Long-Term Proposal.

In this Long-Term Proposal, the research target was mainly focused on glottis function at birth. The factors that regulate glottis function at birth and switch it from a closed “fetal” state to an open newborn state to enable air to enter the lung were specifically investigated for clarifying why non-invasive ventilatory support often fails in premature newborns. The results showed the vital role of oxygen and physical stimulation, while pharmacologic agents were found to be less effective. In addition, the first evidence was provided that elevated airway liquid volume predisposes infants to newborn respiratory complications. Along with applications of imaging techniques to visualization of key factors of transition to air-breathing in premature newborns, development and optimization of phase-contrast computed tomography have been also continued. These can provide detailed and more accurate answers for the biomedical questions than any other techniques.

These findings have been published in 20 papers during the Long-Term Proposal and 28 invited talks were presented at conferences and seminars in this term.

Judging from its influences and publications, the project can be not only considered highly successful but also regarded as one of the most unique scientific activities with full utilization of SPring-8 characteristics.

#### [成果リスト]

(査読付き論文)

[ 1 ] SPring-8 publication ID = 34943

E. McGillick *et al.*: “Elevated Airway Liquid Volumes at Birth: a Potential Cause of Transient Tachypnea of the Newborn” *Journal of Applied Physiology* **123** (2017) 1204-1213.